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The Canadian Medical Association Journal

Contents

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The Canadian
Medical Association Journal

Vol. X. TORONTO, JANUARY, 1920 No. 1

THE SCOPE OF A FEDERAL DEPARTMENT OF HEALTH

By P. H. Bryce, M.A., M.D.

Chief Medical Officer Department of Immigration, Ottawa

IT is difficult to deal adequately with such a subject as the "Scope of a Federal Department of Health" without an historical sketch illustrating the evolution of the public health idea through the progress of scientific medicine; but in the time allotted on the programme I shall endeavour to indicate what present day conceptions and national demands seem to require of such a department.

As social government is possible only through a series of sanctions, by which the individual expects and has a right to get back advantages as a member of the community in lieu of certain natural rights which he, as an individual, has surrendered, so it is essential to know just what government in passing such health legislation actually undertakes to do. *Salus populi suprema est lex*, is an axiom equally good whether based on political principles or on the theory of evolution, since it implies the right of the individual to his self-realization, which Professor T. H. Green, in his ethics, says postulates the removal of all hindrances to a man's "doing things" or achieving his self-perfection.

It is through the advance into consciousness of these elementary principles that we find the best explanation of the world ferment of the present hour. As Professor Wundt says in his "Physiological Psychology", "On the mental side association of immediate events is that condition by which consciousness invariably appears in experience," so there is at the present moment a claimant demand

Read at the fiftieth annual meeting of The Association, Quebec, June, 1919.

that in matters of health, as in those of economic and political opportunity, the individual be freed from all physical hindrances to the realization of the highest possibilities for himself, his family, his community and nation, and for mankind.

What then are some of these hindrances? Obviously the first we think of are ontological, or directly related to being. The British Royal Commission of 1904 reports that in a detailed examination of nearly 4,000,000 persons in various classes of the population, the incidence of feeblemindedness or "amentia" varies from 1·10 per cent. to 4·60 per cent., and that the prevalence of insanity by districts is closely related to that of "amentia". Obviously, then, if an average of 3·28 per cent. of a population is defective, or if in Canada we have 250,000 mental defectives, we must attempt to supply means not only to do the best we can for these defectives, but also to dry up the spring at its source; in other words, prevent or remove the causes producing such conditions. What does this involve? Education, temperance and land reforms, were Professor Green's prescription given in his "Principles of Political Obligations". I would say, however, that while all these are demanded in any adequate scheme of public health, *i.e.*, knowledge of laws, physical and mental, with personal control and temperance in all matters, which, as Dr. Pierce Bailey says, means the educated control of those infantile impulses in the adult which makes him co-ordinate his actions with those of normal society, and of land reforms by which the adequate housing of the people will be assured, yet it would seem that a much finer and more detailed analysis of what our highest self-realization demands is required by the complexities of our organization as individuals.

Professor E. N. Shafer in his presidential address before the British Association in 1912, in tracing the evolution of life, indicated that the functions of the individual cell of the body, the specialization of function of the cells of the different organs and the co-ordination of the cell-aggregate which represents the human body, are all necessary in order that they shall work together for the benefit of the whole organism. He then points out how this is brought about primarily by the influence of the nervous system and secondarily by the activating effects of special chemical substances secreted by the ductless glands, as the thyroid, suprarenals, etc., which when poured into the blood stream stimulate the organs to increased activity. Now it is obvious, as with the development of the animal kingdom upward from the protozoa to the metazoa and then to vertebrates and man, that we shall find special organic

functions becoming more and more evolved, and that the mental operations of a simple peasantry, such as R. Louis Stevenson philosophized about in his "Travels with a Donkey", through the Cevennes of France forty years ago, are very far removed from the complexities of thought involved in the rushing life of to-day.

So it has become with the public health problems of to-day. No longer is our chief concern with the eruptive communicable diseases of childhood as smallpox, measles, etc., because the methods of their control are known and generally accepted; but rather we must seek to solve the problems which are directly the outcome of the growth of a complex, urbanized society, in which the individual meets and has constantly to deal with some new experience forced upon him through modern inventions.

In the centuries preceding the last fifty years, war, famine, and pestilence prevented in a large measure the increase of population and were accepted as agents of evil permitted through the mysterious dispensations of Providence; but to-day it is the man-made agencies as steam, gas, electricity, submarines, flying-machines, and the innumerable machines of industry, which have transformed civilized communities into hives of industry, have brought women from the home and field into factories, limited their maternal powers and instincts, and set their intellectual and emotional faculties to do duty, replacing largely animal functions at once simple and primitive.

Professor G. W. Crile, in his book, "A Mechanistic View of War and Peace," pictures the new situation created by the recent war. He says: "The first effect of war was the mobilization of the forces within the body of each individual in warring countries. In other words, the kinetic system of each individual was activated; there was an increased output of adrenalin, thyreoidin, of glycogen, and an increased mobilization of the Nissl substances in the brain cells, from all of which there resulted an increased transformation of energy in the form of heat, motion, or chemical action. The individual moved quickly, he sang or prayed, his face was flushed, his heart beat faster, his respiration was quickened and there was usually an increase in his body temperature". Such emotions, Dr. Crile remarks, create our mental presentations, which he calls "war patterns" of thought and action. In his last chapter, "Evolution toward Peace," he points out that if war is to cease, "peace patterns" must be developed in the mind to replace those of war and insists that the "Environment is the mould which predetermines the man", and that the only way by which the "action

patterns" of a people can be altered is by changing the mould or altering the environment.

But what, some one may say, has all this to do with the functions of a Federal Department of Health? I may answer by saying that so long ago as 1906 in a paper on "Immigration and Overcrowding of Cities", I pointed out how the duties and functions of the medical officer of health were changing, and that unless he was to degenerate into simply a cog in the municipal political machine, he must realize that the health officer has to do not only with scarlet fever, nuisances, and water supplies, but must also become the centre of all civic health and social activities, since all are intimately associated with health. Investigating a case of scarlet fever in a tenement, the health official finds, it is true, the infectious disease, but also the tuberculous mother, the young girl trying to hold the home together, the boy of school age in a factory, mayhap a child an imbecile and the father a drunkard. Such a single case evidently involves almost every medical, social and economic problem, and to-day a department of health must be as a Minerva springing full-armed from the forehead of cloud-compelling Jove, if it is to realize to the full its manifold functions and responsibilities. Everyone of such problems is being dealt with by up-to-date boards of health in our great cities; health activities are becoming rapidly socialized, and in the home, the shop, the factory and in the mine, the individual is beginning to receive attention as a person.

Naturally it will be found that our communities throughout Canada vary greatly in the stage of their evolution in health matters, as in others, since statistics show some to have a mortality rate approximating that of the pre-scientific first half of the century. If it be said that in these communities the social demands have not been so numerous or complex, it may be replied that the civic growth and evolution of the last twenty years have shown perhaps a proportionately greater development of the means for meeting their special problems than have simple rural districts in matters of health. As Professor Wundt points out, new mental associations are continually appearing in consciousness based upon experience. We may, however, fairly conclude with the coming of good roads, of the motor, of cheap electricity and rural mail delivery to the farm, that new mental associations will soon demand modern housing conveniences and social amenities, while Melba will be heard singing in the hamlets far removed from cities and Caruso be something more than a name.

Realizing then, in some measure, the nature and extent of the

objects to be attained, we shall outline some of the functions which a Federal Department of Health may fairly be expected to perform:

1. It can aid in crystallizing the most advanced health ideas into legislation, common to all the provinces, and provide means by which facts of vital and statistical interest can be tabulated frequently and published for general use.

2. It can arrange for the collection of information regarding threatened epidemic and other diseases, which can be disseminated for the use and guidance of the executive officers of the several provinces and of neighboring States and thus cultivate reciprocity in action for the general health welfare

3. It can co-operate in measures intended to deal with health conditions growing out of our complex life tending to disseminate diseases of a peculiarly social character. Indeed experience shows that such measures must be yet more refined and comprehensive, demanding the education of a too often unwilling public, involving as they do ethical principles accepted only gradually.

Perhaps first in importance of these are the measures for dealing with tuberculosis. It is just twenty years ago since the Ontario Sanatorium Act was passed, and experience since then, as well as its general adoption in other countries, has shown that local sanatoria supply the most practical means, both curative and preventive, for dealing with this disease, satisfying as they do the feelings of the relatives of the sick, while carrying educative influences even into the poorest home. Such centres have led to the evolution of the district sanitary visitor and health nurse and, when associated with an active anti-tuberculosis society, exercise a most potent influence on both health officials and charitable associations, through forcing slum conditions and overcrowding into the field of active municipal politics. There are annually in Canada probably one half as many deaths from tuberculosis as there were of influenza last year; but the poverty induced through long sickness, the loss of wages and the dangers of infection to the family, probably exceed annually the cost of the influenza epidemic which has occurred but once in thirty years.

In dealing then with this disease, it seems most proper that the Federal Department of Health should assist not only through education, literature, and illustrated lectures, but also directly by establishing sanatoria for Indians, by erecting several climate sanatoria where the influence of altitude, sunshine and temperature on various types of the disease can be studied, by assuming the cost of patients going from a sanatorium in one province to one in another, and by

aiding, through a per capita per diem grant, patients in the curable stages of the disease in the several provincial sanatoria.

4. It can stimulate everywhere social and educative agencies to appoint trained nurses, just as school teachers are employed. As the visiting health nurse has become a municipal necessity in tuberculosis work, so she will become more and more the medium for dealing effectively with those social diseases spoken of as venereal, since only gradually will it become possible to reach their silent victims; but wherever clinics have been established in the general hospitals now so widely existing, the district nurse, through encountering their effects in mothers and children, will prove active instruments in inducing patients to receive and follow treatment. In this urgent work it is apparent that Federal regulations controlling the movements of persons under treatment must be passed, while a fair share of the cost of treatment may well be borne by the Federal Government, which has the authority to call upon the man-power of the country to come to its defence, the value of which depends upon its physical efficiency.

5. It can assist in the welfare of mothers and the care of their children by such various ways as are being adopted in England. Not till the Boer war did England fully realize what physical defects meant in the loss of man-power, and since then, and increasingly since 1914, her health programme has undertaken to deal adequately with the potential soldier and producer of wealth through elaborate plans for child welfare. This has been extended here to the point of ensuring, through legislation, medical assistance and home helps for the prospective mother, while in this work the general government assists the municipalities to the amount of 50 per cent. of the local cost. If in this and in venereal disease work, some definite proportion of the cost based upon local efficiency were borne by the Federal Department in Canada, results proportionate to those in England would doubtless be obtained.

This important matter has just been reported upon in a special report in England by Dr. Janet Campbell dealing with "The Health of Women in Industry". She states that there is a lessened birth-rate in women who work in industries and a relatively high death-rate, varying with poverty, bad housing, defective sanitation, and the nature of the occupation. The assumed cause of the high mortality is the lack of "mothering" for the infants, while the inferior health of the overworked mother must be directly contributory. In view of all the difficulties in dealing with married women in industries the report says: "That action in caring for the expectant

mother can best be carried out by the local health authorities providing ante-natal and maternity facilities." This work in England is intimately related to the aid granted to such mothers under the Insurance Act of 1912 and the Maternity and Child Welfare Act of 1918, which provides for medical help, advice of health visitors, maternity or child welfare centres, and food and milk both for mother and child.

6. It can institute some comprehensive scheme whereby the best results of medical science can be brought to the poorest individual. The facts just given indicate the direction in which systematic child saving work will proceed in Canada; while the amount of money spent ($811,774.32 in 1917 in Ontario) on the 172,000 members* of the Friendly Societies in Ontario makes it plain that many persons in Canada are already educated in the idea of organized mutual help; but the fact that the medical services paid for amounted to only $90,621.00 by all these societies, shows that there was either little real sickness or that the insured persons went elsewhere for treatment on the ground that the quality of the services so poorly paid for would be about in proportion to their cost.

In nothing perhaps would compulsory health insurance lead so directly to beneficial results as in the early care of syphilitic cases and especially of infected prospective mothers. When it is recalled that at least 50 per cent. of the children of syphilitic mothers die†, the great advances made in recent years in the treatment of the disease by salvarsan products may be appreciated through the reports of several London clinics, as that of the London Lock Hospital which reports that in eight months sixty-eight pregnant women were given treatment for venereal diseases, and that of these forty-two were delivered and that of the syphilitics most gave after delivery a negative reaction, while thirty-seven out of forty-five children in another clinic were born alive.

7. It can greatly extend the scientific methods of dealing with the admission, as at sea-ports, of diseased or defective immigrants, to Canada. This implies the existence of a fully qualified staff of all-time medical officers to carry on inspection during the immigration season, and who at other times would be employed in studying social problems and making surveys in those districts especially to which immigrants have gone.

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*These had 33,468 sick in 1917 and included 166,872 weeks illness.

†Haufmann states that in sixty-six pregnancies in nine married couples only thirteen children were born alive of whom only two appeared normal.

8. It can establish and equip laboratories to assist both in the work of the several services already indicated and by investigating new problems in the more techinical work of the Department. It is interesting to know that the laboratories of the Inland Revenue Department are to be transferred and will naturally devote their attention especially to food problems as they relate to nutritive values and their bearing upon child hygiene. Such could also be made of much value in establishing standards of foods in relation to their digestibility and food values in proportion to their market price. It seems apparent that maternity homes and child welfare centres must soon become the places where will be taught and whence will radiate more practical knowledge and direct benefits to health than through any other agency. There will begin the preventive and corrective work, often after regrettable delay and permanent injuries to the children have resulted due to defects readily curable in the pre-school age. which in recent years has been carried on in the public schools.

I have attempted very imperfectly to outline some of the functions of a Federal Department of Health established in this reconstruction period after the war. When we recall that it is not much more than fifty years since the first facts were known about the agents of decomposition through fermentation and putrefaction and less than that since the germ theory of disease was either known or accepted, we may well be gratified in seeing the preventive and curative agencies in medicine for dealing with disease being daily brought more closely together. Sir Bertrand Dawson, the King's physician, laid down as first principles in his Cavendish lectures last year:

(*a*) That many diseases are preventable;
(*b*) That many more are curable and that every person in the State has a right to the best treatment of his malady known to science; and
(*c*) That there is no political party which would deny either postulate.

The socializing of medicine, by which the State utilizes not only health officials as we have them to-day, but also by which it employs in a definite way the services in England of four-fifths of the total profession in health insurance work, requires the additional steps now being supplied in the Ministry of Health Bill, whereby the poor law service, voluntary hospitals and laboratories of research are gradually being brought into one system, under which

the maximum results of the discoveries of science will be available for the national welfare.

Sir Bertrand Dawson at a public meeting last winter called to promote the Ministry of Health Bill, stated that the physician is a vital part of the structure which had to be built. It was most important to help the general practioner and give him an opportunity for doing his best work. Each year the work of medicine becomes more complex and requires larger equipment. And just as they have fabric and equipment provided for education in the shape of schools, so they would need to bring together all their activities in the health centre. In his opinion the health centre could go a step farther; they wanted something in the centre which could convey the idea of health in its active rather than its passive conception. He suggested open spaces in connection with the clinics, where physical culture and games could be carried on.

At the same meeting, the Honourable Dr. Addison, Minister of the Local Government Board and of Health, stated that there were twenty-one government departments dealing with health matters and more than two thousand local health authorities in England and Wales, and gave these facts as good reasons for co-ordinating their activities under one Ministry. He added that the Ministry would not propose to proceed by compulsion, but that the people only needed practical schemes put before them to ensure their approval and support.

I have referred to the remarks of these two great British authorities, since they accurately indicate the sentiments which will, I am sure, animate the administration of such a department of health in Canada. It is just fifty years since the first report urging the establishment of such a Board of Health was adopted by the Canadian Medical Association, and here, as in England, it has required a great war to arouse the people to a sense of the primary national need, the saving of its man-power. It seems most appropriate that in peace as in war the "mental patterns" which activate all national action, should travel *æquo pede* through every State within the Empire over which the flag waves, and what can be more appropriate than that we should wish to see in one of the quarterings of our coat-of-arms, Æsculapius, with his ever-wise attendants, sitting meditating sublime wisdom? We hail the presence of all the daughters of the Grove with its health-giving ever-flowing springs, Healing (Janiscus); Help (Alexenor); Prayer (Aratus); Well-begotten (Hygieia); Modes of Healing (Jaso), with Panacea, the all-healing herb.

To-day, we dream of medicine as never-ceasing in its efforts to trace back the aberrancies of germ-plasm to its ancestral determinants and to be satisfied with nothing less than that such will again incline toward the normal. Already we know of much that can be done in the pre-natal stage to minimize potential evil; while during infancy and the pre-school age yet more can be accomplished. And so up through "the seven ages of man" the work of the goddess Panacea will operate. Indeed, when true science shall have controlled the springs of being and when the real purpose of life in its ethical aspects is understood and dominates the activities of men, we shall have a right to view man's life as an adventurous journey along a pathway, undulating enough to prevent monotony, gently winding rather than tortuous or labyrinthine, bordered with sweet flowers, banked by sturdy forest trees, and having a descent withal so gentle and gradual that it will scarcely be perceived. Then as evening comes on and the pathway passes under the over-arching boughs we shall behold its euthanasia, the final act of a world drama, the sublime summation of a single human personality whose complex is the whole human race.

THE Congress of the American College of Surgeons, which recently met in New York, discussed at great length the standardization of hospitals. The essential point in the matter is that the constructive work of the college centres in its programme of hospital standardization. Each Fellow of the College is a part of that programme. Its success depends largely upon the extent to which the Fellows, first, enter into the work themselves, and, second, enlist the co-operation of hospital trustees, physicians and surgeons, superintendents, laboratory workers, nurses, and the interested public in the betterment of hospitals.

All the hospitals in New York were mobilized for the congress. Among the noted speakers were the two famous English surgeons, Sir Robert Jones and Sir Anthony Bowlby, whose addresses and work were followed with close attention. The management of the congress consists of a president and board of regents. Each state in the United States and each province in Canada has the right to send a delegate called a governor to the congress.

CONSTITUTIONAL SYMPTOMS AND FOCAL INFECTIONS OF THE GENITO-URINARY TRACT

By David W. MacKenzie, M.D.

The Department of Urology, Royal Victoria Hospital, Montreal

IT is now widely believed that chronic foci of infection may cause metastases, with resulting disease in various organs of the body. There is considerable experimental and clinical evidence upon which to base this belief. The works of Billings, and of Rosenow especially, point towards the relationship between chronic focal infections and chronic arthritis and nephritis, and suggest that cardio-vascular changes, myositis and neuritis may also be caused by similar foci.

The importance of focal sepsis in its relation to the genito-urinary tract entitles it to a prominent position in the minds of internists, general surgeons and the various specialists. Among the numerous septic infections involving the genito-urinary system, which, untreated, are prone to lead to constitutional involvement, may be mentioned acute suppurative nephritis, pyelitis, pyelonephritis, pyonephrosis with or without calculus, tuberculosis of the kidney, renal and perirenal abscesses, ureteritis, pyo-ureter with or without calculus, cystitis, especially associated with urinary obstruction, prostatitis, seminal vesiculitis, epididymitis, etc.

This is by no means a new subject; indeed, the seminal vesicles have received much attention for several years, they, with the tonsils and teeth, absorbing their full share of attention. Ever since Poynton and Paine[1], in 1910, described their diplococcus of rheumatism which they obtained from the blood, pericardial fluid and tonsils, the profession has been aroused to a long neglected field of medicine. Billings[2], in 1911, in an article on chronic focal infections, after calling attention to the tonsils, throat, gums and teeth, bronchiectatic and pulmonary cavities, gastro-intestinal ulcers, appendicitis and colitis as foci of infection, mentions that the urinary tract may also be a site of such infections.

Paper read before the New Brunswick Medical Society, July, 1919.

"Pyelitis, even when there is only moderate obstruction of the kidney pelvis, may produce myositis, arthritis, neuritis, etc. The prostate and seminal vesicles are a common source of infection in gonorrheal rheumatism and probably in ordinary septic infections. The Fallopian tubes and uterus are less common, and the parametrium more common focal sources of infection. Local submucous and subcutaneous septic foci anywhere may be the source of systemic diseases."

In 1912, interest increased with the publication of Davis[3] on the bacteriology of focal infection, and Gilmer[4] on chronic oral infections.

In 1913, came the writings of Fuller[5], Bass[6] and Wright[7], with a symposium by the American Medical Association in which papers were read by Billings[8], Young[9], and McCrae[10]. In 1914, 1915 and 1916, the seminal vesicles received considerable attention, and papers by Barney[11], Brackett[12], Fuller[13], Quinby[14], Squier[15], Thomas[16], Belfield[17], McCrae[18], Anderson[19], and Culver[20], were published. Most of these, it is true, placed their focal infections in the seminal vesicle with the tonsils and teeth as close seconds.

Billings, speaking on chronic focal infections generally, gives as related internal disorders this rather extensive list, namely:—acute rheumatism, arthritis deformans, gonorrheal arthritis, malignant endocarditis, myositis, myocarditis, pericarditis, septicæmia, nephritis, various visceral degenerations, thyroiditis, pancreatitis, peptic, gastric and duodenal ulcers, cholecystitis, appendicitis, various cardio-vascular degenerations, arterio-sclerosis, chronic neuritis, chorea, erythema nodosum, herpes, spinal myelitis, and iridocyclitis; a rather formidable array to which Wright and McCrae add secondary anæmia, urticaria, furunculosis, eczema, diabetes, purpura hæmorrhagica, asthma, chronic catarrh, nervous breakdown, anorexia, tachycardia and asthenia.

The recital of such an extensive list of maladies due to chronic focal infections is enough to show the impossibility of treating even the genito-urinary portion in anything like an exhaustive manner. In order to discuss the subject systematically and briefly, it seems best to take up the various genito-urinary regions subject to infection, and to point out anatomical conditions which render them natural points for the localization and persistence of infectious processes.

Kidney.—Starting with the kidney, its anatomy and pathology afford many opportunities for absorption from such localized foci. In the glomerulus we find a distended sac with constricted neck and

uphill drainage; and also in the urinary tubule imperfect drainage in the ascending portion should infection occur. In localized suppurative nephritis and perinephritis the chances of absorption and resulting general sepsis are even greater. From the renal pelvis and calices the drainage is generally good, but inflammatory infiltrations, calculi and abnormalities interfere with drainage, and pelvic dilatation hydronephrosis, destruction of renal cortex with infection follow, and produce ideal conditions for systemic invasion with toxins and bacteria. And yet we find little in the literature on systemic disease from focal infection of the kidney and pelvis. Indeed, Young, speaking on this subject in 1917, says:

"Rheumatism and arthritis are certainly very rare as complications." But he finds many cases of chronic myocarditis, and less often endocarditis. Billings, however, says:

"Pyelitis even with only moderate obstruction of the drainage of the kidney pelvis may produce myositis, arthritis, neuritis, etc."

Streptococcus, though occasionally found, are certainly less common in renal infections than the staphylococcus and colon group; the staphylococcus being found in cortical and perinephritic infections, and the colon bacilli in the renal pelvis and tubules. This may account for acute rheumatic symptoms being so much less frequent as complications of infections of renal pelvis than the more chronic general toxæmic type of symptoms, as the following cases will demonstrate:

Case No. 27. Hospital No. 83280. C. P., admitted March 12th, 1917. Occupation, insurance; age, fifty-one; married; born in England. Came complaining of sleeplessness, nervousness, irritability, frequent urination. Thirty-one years ago had an indefinite history of hæmaturia with pain in one side. Has lost weight rapidly in past two years. Treated two years ago in hospital for neurasthenia. Seven weeks ago was operated upon for hemorrhoids. Is now, on admission, very much emaciated, weak and nervous, refuses to be left alone. Weight, 107 pounds.

Physical examination: Poorly developed, poorly nourished man; very nervous and excitable. Inguinal glands easily palpated. Lungs clear except for numerous moist râles over base of right lung behind. Heart sounds clear, regular, no murmurs; pulse regular and of fair volume. Lower pole of right kidney palpable in costolumbar space where there is considerable tenderness; otherwise normal.

Urine examination: Dark, cloudy, 1020, albumen ++,

glucose, none; microscopical examination showed pus +++, and occasional granular casts.

Kidney function: Phenolsulphonephthalein 1 c.c. intramuscularly. Appearance, time 15 minutes; first hour, 38 per cent., second hour, 25 per cent.; total, 63 per cent.

X-ray plate No. 145 shows a large irregular shadow in the region of the right kidney pelvis.

Cystoscopic examination: March 9th, 1917. Instrument easily introduced. Bladder much contracted with marked inflammation of mucous membrane. Right ureteral orifice pouched out and inflamed; left, normal. Right ureter easily catheterized to pelvis; worked well, giving a thick, cloudy, dirty urine. Volume, 2 c.c.; urea, 0·01; microscopical examination showed pus ++++, numerous epithelial cells, no casts. Left kidney urine clear and straw colored; normal.

On account of patient's bad condition, a hurried right nephrectomy was done on March 12th. Curved right loin incision; perinephritic fat small in amount, adherent. Irregular fluctuating kidney with large irregular stone in pelvis. Ureter examined, but no calculi felt in it. Ligated and cauterized four inches from pelvis. Vessels ligated individually. Small rubber tube drainage.

Pathological diagnosis: Right pyonephrosis with calculus.

Discharged March 26th, 1917, having gained three pounds in weight. Reported February 8th, 1918, having gained forty-one pounds in weight, feeling well, eating well, and irritability and nervousness entirely gone.

Case No. 1002. Hospital No. 97499. Admitted January 4th, 1919. E. M., housewife, aged fifty-five, married, born in Canada. Came complaining of severe pain in left shoulder; onset July, 1918; extremely acute since January 1st; cannot move left arm on account of pain in shoulder and down the arm. Also complained of slight frequency of urination; at times a dull pain in left loin.

Is a pale anæmic woman, poorly nourished; skin dry and nonelastic. The slightest active or passive movements of left shoulder joint impossible on account of great pain experienced. Tenderness in left costo-lumbar angle. Unable to palpate kidney on account of pain. Some suprapubic tenderness. Slight tenderness in right costo-lumbar angle.

Urine examination: Slightly cloudy, acid, 1012, albumen +++, sugar negative; microscopic examination showed pus

++++, blood +, epithelial cells ++, no casts, no tubercle bacilli.

Cystoscopic examination: Urethra small. Bladder mucosa markedly inflamed throughout. Left ureteral orifice pouting; unable to pass catheter further than half-way up to the kidney. Hydronephrosis of left side. Right ureter easily catheterized to pelvis of kidney.

SPECIMENS OBTAINED

	Right	Left
Macroscopical . .	Clear amber	Cloudy amber.
Volume	2 c.c.	2 c.c.
Urea	·007	·006.
Microscopical . . .	Rare leucocytes .	Pus ++.
	Epithelial cells. . .	Epithelial cells, bacteria.
Smear	Negative	Polymorphs and bacilli.
Culture (9227-8)	No growth	Bacilli coli communis.
Phenolsulphonephthalein 1 c.c. intravenously:		
Appearance time . .	2½ minutes	5 minutes.
Amount in 10 minutes	8 per cent	4 per cent.

Amount in bladder at close; a faint trace.

Operation January 13th, 1919, for left suppurative nephritis. Curved left loin incision. Kidney high; marked subacute adhesions with many large vessels. Kidney freed; ureter freed for six inches, ligated and cauterized. Vessels of pedicle ligated and cut. Kidney shows marked adhesions; capsule thickened; many elevated greyish areas all over cortex.

Pathological report: Capsule is for the most part intact. Throughout the cortex are scattered areas of œdema and infiltration. In these areas the tubules are partly compressed and partly obliterated. The glomeruli are congested and many of them are replaced by pus. About the glomeruli there is a dense infiltration of white blood cells, chiefly polymorphs. The medulla is less affected, but radiating streaks of infiltrated tissue extend into it. In the lumen of some of the tubules pus can be seen. Diagnosis: Exudative nephritis. Hæmatogenous infection.

Urine examination on discharge: Cloudy amber, acid, 1014, no albumen, no sugar, few epithelial cells and bacilli.

Discharged February 12th, 1919. Shoulder much improved;

able to place hand on head. Reported March 15th, 1919, able to do some work with arm. Feeling much better. Gained eight pounds. Reported October 15th, 1919. No pain in left arm. Feels splendidly. Gain of 22 pounds in weight.

Case No. 956. Admitted December 3rd, 1918. W. J. A., chauffeur, age twenty-seven, married, born in the United States. Came complaining of chills, fever, headache and backache. Was taken ill during period of the influenza epidemic, and his case was diagnosed as "influenza", and treated as such for about two and a half weeks previous to admission to the hospital, when pain in loin and pus in the urine drew attention to the genito-urinary tract. Fever on admission, 104·4°. No history of pyuria, though several examinations were made during the two and a half weeks previous to admission, until the day of admission, when microscopical pus was found.

On admission there was marked right costo-lumbar tenderness; indefinite mass palpated in this quarter. Slight costo-vertebral tenderness on left side. Kidneys not palpated. Prostate slightly boggy, no fluctation found.

Urine examination: Cloudy amber, acid, 1012, albumen faint trace, no sugar, pus ++, scattered red blood cells and bacteria. Leucocyte count, December 7th, 26,600.

Cystoscopic examination: December 9th, 1918. Urethra normal. Bladder mucosa slightly inflamed throughout. Ureteral orifices normal in size, shape, and position, and involved in general inflammatory process. Both ureters catheterized; left not persuaded up beyond 3 cm. Examination of urines thus obtained:

Right—Macroscopic, clear amber; urea, 0·007 per cent.; microscopic, few scattered white blood cells and urates. Left—Microscopic, clear amber; urea, 0·01 per cent.; microscopic, few scattered white blood cells and urates.

X-ray of genito-urinary tract negative for stone.

Operation December 12th, by colleague, when a large right perinephritic abscess was drained. Culture of the pus showed staphylococcus aureus. Fever continued irregularly from 100-102½°. The urine still showed pus. December 23rd, rectal examination by Dr. MacKenzie. Large fluctuating mass involving the greater part of the prostate and periprostate regions. Also marked tenderness in left costo-lumbar angle.

Operation same day. Perineal section. Drainage of large prostatic and periprostatic abscess which extended well up beneath the neck of bladder. Freely opened and syphon drainage estab-

lished. Incision in the left loin and several ounces of thick pus obtained, which also gave on culture staphylococcus pyogenes aureus.

From this time the patient's condition continued to improve. He rapidly gained in weight. Discharged at his own request December 28th, perineal wound closed; urine passing through urethra. Returned a few days later and remained in the ward until January 19th, when he was discharged; condition good.

Case No. 305. Admitted September 10th, 1917. J. M., broker, age fifty-five, single, born in Canada. Recommended by Dr. Kinghorn, Saranac Lake, N.Y. Chief complaint on admission: chills, fatigue, and cough. Onset about June, 1917. In the latter part of June, 1917, he awakened in the morning in a terrible sweat; felt somewhat fatigued but not sick. Cough began at this time and gradually grew worse. In bed five days, then about the house three weeks, although he continued to have sweats at night and cough was still present. On examination at that time he was thought to have pulmonary tuberculosis of the left base, and sent to a sanatorium at Saranac Lake. Sputum was examined several times, but no tubercle bacilli found. Dr. Kinghorn advised his transfer to our service at the Royal Victoria Hospital, where a mass was found in the left hypochondrium, and some pus in his urine. Had had no urinary subjective symptoms whatever, no pain in loin, no history of passage of stones or gravel, or bloody urine. Has lost 25 pounds in past two months.

September 10th. Urine examination: Cloudy, 1017, acid, albumen a faint trace, no sugar. Under the microscope were seen occasional red blood cells, scattered white blood cells and a few motile bacilli.

Kidney function: phenolsulphonephthalein 1 c.c. intramuscularly. Appearance, time fourteen minutes; first hour, 50 per cent; second hour, 16 per cent.; total, 66 per cent.

Blood examination: red blood cells 4,150,000; white blood cells, 14,000; hæmoglobin, 77 per cent.

Cystoscopic examination, September 11th, 1917. Meatus small. Bladder inflamed and trabeculated. Slight intra-vesicular enlargement of prostate. Right ureter seemed to functionate at regular intervals. On teasing left ureteral orifice, thick, worm-like pus was seen to come from it. Both ureters were catheterized to pelves of kidneys; liberal specimen from right; impossible to get specimen from left though catheter was patent; on irrigating through ureteral catheter, some thick pus was obtained. Examination of these specimens gave the following results:

Right—Macroscopic, clear straw; volume, 2½ c.c.; urea, 1·5 per cent.; microscopic, amorphous urates; no pus or casts. Left—Microscopic, drop on slide shows pus +++. Culture from right side gave no growth. Culture from left side gave bacillus vulgaris.

X-ray shows large indefinite shadow in region of left kidney, probably cheesy material or calcareous debris; also a smaller shadow below.

Operation September 12th, 1917. Nephrectomy for pyonephrosis with calculi on left side. Curved loin incision. Perinephritic capsule opened. Large nodular kidney with adhesions; freed with care. Ureter large and thickened with several large calculi felt in lumen of upper end; traced and freed for six inches from kidney pelvis; ligated and cauterized. Vessels of pedicle ligated and cut between ligatures. Rubber tube drainage. Wound sutured.

Pathological diagnosis: Left pyonephrosis with calculi. Entire kidney parenchyema gone; replaced by fat necrosis.

Examination of the urine previous to discharge gave the following results: Clear, pale, 1005, acid, no albumen, no sugar. Under the microscope occasional white cells and epithelial cells were seen. Patient was discharged October 2nd, 1917.

Reported February 12th, 1918, having gained 12 pounds in weight. No cough, no sweats.

Ureters.—We have mentioned the changes at the upper end of the ureter which lead to urinary obstruction, pyelitis, nephritis, etc. Similar conditions may exist almost anywhere in the course of the ureter with similar results, more particularly in the pelvic portion where the ureter is often involved in the diseases of the reproductive organs in the female, and sometimes of the seminal vesicles in the male.

The terminal portion of the ureter is frequently obstructed by calculi, strictures, tumors and congenital defects, and we often find it transformed into a dilated, flabby tube filled with stagnant infected urine, surely most propitious for producing back pressure effects, and a general toxæmia. Here again the literature helps us little. We have many instances, however, of impaired kidney function, pyemia, asthenia and digestive disturbances from such pyo-ureters.

Case No. 124. Admitted, May 7th, 1917. C. M., housewife, age twenty-three, married, born in England. Came complaining of malaise, loss of appetite and strength, pain in right loin radiating down to the thigh. Began two months ago with a dull ache in the back, and loss of appetite; pain seemed worse on walking.

On admission, urine was clear, straw coloured, acid, specific gravity, 1010, albumen faint trace, no sugar. Under microscopical examination: epithelial cells, scattered white blood cells were to be seen, but no pus or casts.

May 9th. Urine clear, straw coloured, acid, 1012, albumen faint trace, no sugar. Microscopical examination shows a few scattered white blood cells and epithelial cells. No pus or casts.

X-ray of genito-urinary tract shows a shadow about the region of the right ureter slightly below the kidney.

Cystoscopic examination: Bladder slightly inflamed, more marked about the floor and towards right ureteral orifice. Both ureters easily catheterized to pelves of kidneys and specimens obtained. Their examination gave the following results:

Right—Macroscopic, clear straw; volume, 5 c.c.; urea, 0·2 per cent.; microscopic, epithelial cells, pus +. Left—Macroscopic, clear straw; volume 1½ c.c.; urea, 0·1 per cent.; Microscopic, epithelial cells; no pus or casts.

Phenolsulphonephthalein given intravenously made its appearance on right side in four minutes; on left side in four minutes. The amount in five minutes was 2·8 per cent. on right, 3 per cent. on left. Amount in bladder at close, about 2 per cent.

With catheters in position, an *x*-ray plate was taken which showed a shadow about one half an inch external to the catheter.

Thorium injection shows a relatively normal renal pelvis at extremity of catheter. Also shows thorium below stone connecting with catheter.

Diagnosis: Double right ureter with impacted stone in lower branch.

Operation June 5th, 1917, for pyonephrosis and stone; double ureter and double renal pelvis.

Pathological report: Right double renal pelvis and ureter with pyonephrosis.

Urinalysis, June 22nd: Clear, straw, acid, 1015, albumen, a faint trace, no sugar. Under the microscope were seen scattered pus cells.

Discharged June 22nd, 1917, markedly improved, appetite good, some gain in weight.

Case No. 1138. Admitted March 17th, 1919. W. P., farmer, age thirty-three, born in England. Came complaining of indefinite abdominal pain. Onset fifteen to eighteen years ago, pain over the bladder region, no frequency, slight hematuria about nine years ago, loss of weight and strength, malaise.

Urine examination: Cloudy, amber, acid, 1016, albumen +, sugar negative. The microscopical examination revealed pus ++, and motile bacilli.

Phenosulphonephthalein output: First hour, 33 per cent.; second hour, 17 per cent.

X-ray of genito-urinary tract shows a large calculus in region of bladder, probably in the lower portion of the left ureter.

No tubercle bacilli found in urine. Culture of urine shows B. coli communis.

Cystoscopic examination: Bladder floor coated with thick shreddy pus. Bladder mucosa much inflamed throughout. Both ureteral orifices relatively normal in position. Some bulging above left ureteral orifice. Thick pus at times greater from left orifice. Catheter can only be persuaded to go about 2 cm. on this side. The right was catheterized and gave a normal urinary output.

Operation March 20th, 1919, for large left ureteral calculus. Curved left inguinal incision. Peritoneum pulled to mid line. Dilated ureter as big as an ordinary colon opened and large calculus removed. Much urine loaded with pus gushed from the ureter on opening. The ureter was sutured, and cigarette drainage employed. Patient did well for several days, when he suddenly developed acute peritonitis and died.

Autopsy showed a much dilated ureter with destroyed kidney on the left side. The operative opening was healed and about three inches above this was a rupture of the ureter into the peritoneal cavity, where a pronounced exudative peritonitis was found. There was a general parenchymatous degeneration of all the organs, congestion and œdema of the lungs, productive pericarditis, productive pleurisy (bilateral), and numerous small gummata of liver and gut.

Bladder.—It is not to be expected that much absorption will occur from a simple cystitis. The stratified epithelium of the bladder is one of the least absorbent surfaces in the body, and with good drainage little trouble is caused by severe and long-standing cases of vesical infection. Sometimes the mucous membrane is so resistant that an infection may persist for months without showing evidence of inflammation of the mucosa. Such infections are nearly always secondary, and I am in the habit of saying what is very nearly true, that there is no such condition as a simple cystitis *per se*.

When obstruction is present, however, drainage is interfered with, residual urine develops, the bladder wall hypertrophies, then atrophies and becomes trabeculated, pouches and diverticula form,

and excellent opportunities for infection, deep-seated inflammation, ulcers, septic absorption and general infection occur. Here by far the most common organism is the bacillus coli with the staphylococcus family second. The course followed by the bacillus coli infections of the bladder is seen best in cases of prostatic obstruction. After a few catheterizations the bacilli are generally found in the urine. For a time they may produce no inflammatory reaction, appearing simply as a bacilluria, but as a rule a mild acute cystitis and urethritis result with varying systemic manifestations—fever, malaise, and occasional chills with moderate evidences of toxæmia. After a short period (four to ten days), a tolerance to the chronic infection which has by this time become engrafted, is usually established, and the patient may go on catheterizing himself for the rest of his days with only occasional attacks of sepsis. If, however, catheterization is not regular, and considerable residual urine is persistently present, pressure affects with trabeculations, diverticula, dilatation of ureters and renal pelves occur, and may lead to results of a serious nature on the whole organism.

Adami considers that subinfection with bacillus coli is responsible for the production of an important series of chronic morbid states. Just as these bacilli may get into the circulation from the intestinal tract when in an abnormal condition, stasis or otherwise, so may the same organis, infect and poison the body in chronic urinary obstructions, causing low grade infections, anæmia, anorexias, etc.

A more potent effect, however, is probably produced upon the kidneys, and through them upon the heart, blood-vessels and other vital structures, by infections combined with back pressure. The clinical picture is a common one, a pale, anæmic, asthenic patient, with lack of appetite, at times nausea and severe digestive disturbances, and with evidences of myocarditis, arterio-sclerosis, hypertension, and chronic renal infection. The catheter shows considerable residual urine of low specific gravity and poor quality; the phthalein test reveals marked impairment of kidney function, and uremic and cardiac crises during the course of palliative treatment emphasize clearly the desperate condition of the patient. Such cases not infrequently show little or no urinary symptoms, and go along untreated, or mistreated, for months, or even years, while the insidiously destructive effects of residual urine, back pressure and colon bacillus infection go merrily on unsuspected, and the patient is treated for cardio-renal disease, hypertension, indigestion, anæmia, neurasthenia, or even paresis.

How many of these infections are brought to the clinic, and how surprised are their physicians when the catheter withdraws a pint or more of residual urine, and the phthalein test shows a mere trace. The only complaints of one patient who recently consulted Dr. Hamilton of our medical department, were general weakness, indigestion, dry, foul morning tongue, with loss of weight and strength. On examination he was found to have about seventy-two ounces residual urine of 1010 specific gravity, and a very low phthalein output, a large prostate per rectum, and larger still intravesically. He has just left the hospital after recovery from his suprapubic prostatectomy, with his digestive symptoms much improved, his complexion cleared, and he himself feeling generally better.

The proof of the urological ætiology of these disorders is the marvellous way they disappear when the back pressure of residual urine is relieved by systematic catheterization, indwelling catheter, suprapubic drainage or prostatectomy. It is very gratifying to see patients who were apparently *in extremis* gradually becoming rational as the uræmia disappears, and to observe the vascular, myocardial and endocardial conditions improve so astonishingly that ultimately a radical prostatectomy can be carried out without risk. The remarkable recuperative power of the kidneys is shown by scores of cases in which the phthalein test and blood urea indicate only a trace of functional capacity left on entrance to the hospital, but which under catheter drainage so rapidly improve that often within ten days or two weeks, a fairly good functional output was obtained, and operation successfully performed.

The following examples may demonstrate the truth of these assertions. No. 1236–560, admitted May 19th, 1919, occupation sea captain, age seventy-two, married; born in Canada. Came complaining of general weakness, foul taste in mouth in morning, frequency of urination, constipation. Onset four years ago.

Symptoms: General weakness, foul taste in mouth on waking in morning, frequency of urination, constipation, difficulty in starting stream, dull aching sensation in bladder region. About four years ago, noticed the frequency of urination; at first would void once a night and four or five times during the day; the night frequency has gradually increased until now he voids about every hour by night, and every two or three hours by day. The urinary stream has gradually become small until at present the urine dribbles away; there is difficulty in starting the stream at times; there is no hæmaturia, and no history of calculi passed. Previous and family

history of no particular interest here. In general appearance, he is a man of good normal make up, of sixty-five to seventy years of age. Physical examination relatively good throughout. Cardio-vascular system: pulse, 80; regular, good, no œdema; blood pressure—systolic, 185; diastolic, 100. Gastro-intestinal system—teeth poorly preserved, tongue dry and coated. Abdomen—no costo-lumbar tenderness right or left; bladder extends almost to umbilicus. Rectal examination—prostate much enlarged, smooth, no nodules, no tenderness. Residual urine, fifty-two ounces. Urine examination: Clear, amber, acid 1010, albumen, a very faint trace; sugar, none. Microscopical examination shows scattered white blood cells, epithelial cells and urates. Kidney functional output (phenolsulphonephthalein 1 c.c. intramuscularly): appearance time not estimated; first hour and twenty minutes, 9·5 per cent.; second hour, 12 per cent.; total, 21 per cent. Skiagraph of kidney, urethra and bladder negative for calculi. Retain-catheter introduced on admission; worked for forty-eight hours, then caused patient considerable discomfort. Preliminary supra-pubic drainage performed May 22nd, 1919, under local anæsthetic of ½ per cent. novocain; showed a large distended bladder with markedly enlarged prostate intravesically; bladder wall much trabeculated and thin. Large middle lobe with much enlarged lateral lobes removed by supra pubic operation on June 5th; moderate bleeding. Prostate removed showed marked cyst-adenomatous degeneration. Following operation, patient's condition improved rapidly and he was discharged with tongue clean, appetite good, and with a marked gain in weight.

Case No. 1249–745, admitted May 27th, 1919, referred by Dr. Boyer, Prince Edward Island, farmer, age sixty-two, widowed, born in Canada. Came complaining of retention of urine, incontinence at night, pain in the loins, hæmaturia, and general loss of strength with marked digestive symptoms. Onset one year ago, began with slight day and night frequency. In January, 1919, incontinence of urine at night; in February, 1919, complete retention; catheter life since. Physical examination showed a well developed and well nourished elderly adult, active, even younger than his years. Gastro-intestinal system—upper teeth false, lower ones much discoloured stubs; tongue slightly dry. Slight tenderness detected in right costo-lumbar angle; none on the left. Residual urine, twelve ounces, which is foul smelling and bloody. Prostate by rectal examination found moderately enlarged, not adherent, with no nodules, and not tender. The urine was cloudy,

red, acid, specific gravity 1020; albumen +, sugar none. Microscopical examination showed pus +, red blood cells +, many rodded bacilli. An *x*-ray of kidneys and bladder showed no abnormal shadows. Kidney function not tested on account of amount of blood in the urine. Cystoscopic examination:—Cystoscope introduced with slight difficulty; marked intra-vesicular enlargement of middle lobe of prostate with considerable enlargement of lateral lobes; bladder mucosa inflamed and congested; marked trabeculation with diverticulation. Retain-catheter introduced. Suprapubic prostatectomy was performed June 20th, 1919, and a large prostate removed, which showed marked glandular hypertrophy. The patient was discharged July 4th, 1919, having gained much in weight and strength, with a clean tongue and good appetite, and otherwise generally improved.

Such cases might be enumerated at length, but suffice to say that not only is it possible to bring back well towards normal by preliminary catheter treatment, kidneys which have been greatly impaired, but also at the same time to bring about such a great improvement in the cardiac condition that where operation seems at first unthinkable, it may finally be safely performed.

The Urethra and Adnexa.—Here we have an anatomical system rich in structures for potent infection, and with an entirely distinct bacteriology. The various glandular structures surrounding and draining into the urethra, all with narrow ducts, furnish a most fertile field for the development of chronic infections. The prostate, verumontanum, utricle, and ejaculatory ducts, seminal vesicles, vasa ampulla, vas deferens, epididymis and testis, comprise the most complex functional system in the body, and as one or all are infected in thousands of cases of gonorrhœa, we can appreciate the dangerous conditions of these patients, not only to society, but also to themselves.

Gonorrhœa is of course a great preliminary cause of infection, but space does not permit here discussion of this most important chronic disease. As a result of the newer preparations, an aroused medical profession, and increasing interest among the laity, gonorrhœa is less prevalent, more often cured, and deep-seated chronic infections are now less frequent than formerly. They are sufficiently prevalent, however, to be our greatest infectious menace, and the medical profession is even yet rather ignorant of, or indifferent to the fact that a patient is never to be declared well simply because the discharge has ceased, and shreds are no longer present in the urine. The examination of the secretions from the prostate

and seminal vesicles, and the taking of blood for a complement fixation test are so easy and so decisive that it should never be neglected before discharging an acute or chronic gonorrheal case as cured. The lesions produced by the gonococcus are manifold; almost every tissue and structure of the body has been invaded by this organism. We have gonorrheal septicæmia, endocarditis, arthritis, synovitis, myositis, pleuritis, meningitis and localized abscesses in almost every part of the body.

One of the most interesting phases of chronic gonorrheal inflammation is the general disappearance of the gonococcus and its frequent replacement by other bacteria, particularly staphylococcus albus and streptococcus. This has been many times demonstrated in chronic seminal vesiculitis. It has been shown that the gonococcus disappears with increasing rapidity as the years go by. I have never been able to recover gonococcus from the prostatic secretion after the third year. Culver in a study of twenty-four cases of chronic vesiculitis with arthritis, found streptococci in six cases, micrococci in four cases, staphylococci in six cases, colon bacilli in one case, proteus twice, and gonococci four times. It has been pretty well proven that the pyogenic cocci and not the gonococci, or colon bacilli, are responsible for the chronic infections of the prostate and seminal vesicles, and also for the arthritis and rheumatic conditions which so frequently accompany them.

Rosenow's ideas of transmutation and selective tissue affinity are very attractive, and have been accepted by many; others like Squier have suggested that it is not too much to presume that the gonococcus may mutate and "what is in the beginning a Neisserian seminal vesiculitis is latterly a streptococcus infective process. Holman[21], however, offers evidence from a long and varied experience against the occurrence of mutations, and feels that a culture of streptococci, once carefully purified, remains true to type, even for years. Clinical cases in great number are on record to prove the varied lesions of remote and serious character, which owe their existence to the seminal vesicles, prostate and annexa.

When Dr. Eugene Fuller began his work on the drainage of the seminal vesicles for chronic rheumatism, the profession was not quite ready to receive his views, but since that time many others have followed his example and added their quota to make the profession realize that one of the commonest causes of chronic rheumatism, arthritis, myositis, endocarditis, neuritis and various other remote lesions mentioned at length earlier in this paper, is focal infection in the seminal vesicles, generally improved by operation for drainage or extirpation.

I feel here that the seminal vesicles have received more than their share of attention, and that the rôle of the prostate in such local and remote infections has been too much neglected. Not in frequently the prostate is seriously inflamed in conjunction with the seminal vesicles, and it may be responsible alone, for remote rheumatic and cardiac lesions, and should be incised and drained in any questionable cases.

The verumontanum composed as it is of glandular and cavernous tissue, and containing the utricle, ejaculatory ducts, and a highly complex nerve supply, is also a common site of focal infections causing remote symptoms. Not only do we have chronic inflammatory conditions accompanied by disproportionately severe sexual and urinary symptoms, but the most remarkable referred symptoms frequently appear. The condition is really a part of a chronic prostatitis, and should be considered as such.

Young, Geraghty and Stevens[22], in a study of three hundred and fifty-eight cases of chronic prostatitis found that referred pains of varied character were present in a large proportion of cases. The most common site was the back, sixty-four cases; perineum, thirty-five; suprapubic region, twenty-two; hips, ten; thighs, twelve; knee, four; leg, four; simulating sciatica, five; kidney region, eight; simulating renal colic, ten; and our findings are much the same. The widespread character is thus evident.

McCrae, on "Remote effects of lesions of the prostate and deep urethra," cites "several cases in which the symptoms have been referred to the heart—palpitation, rapidity of rate, præcordial distress and tachycardia, at times simulating angina pectoris." He also mentions a patient who suffered with severe attacks of abdominal pain due to inflammation of the verumontanum which could be reproduced by touching the verumontanum through the urethroscope. "There could be no doubt of the severity of the attack—the patient went almost into collapse." We have seen many patients who had been treated for a host of diseases—lumbago, sacro-iliac disease, renal calculus, appendicitis, neuralgia, sciatica, and various neuroses and psychoses, all due to disease of the verumontanum, prostate, or vesicles, the frequency and importance of which are little appreciated by the medical profession.

The seminal tract is likewise a frequent focus of infection for tuberculosis and other suppurative processes, which Belfield speaks of as the "pus tubes in the male". Hagner's work on the epidymis has drawn attention to the foci of suppuration there, and the value of prompt drainage.

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LONDON medical schools which have prepared schemes for the reconstruction of their clinical teaching have been officially informed that they could count on financial assistance through the Board of Education, based upon approved expenditure incurred in carrying out such schemes. In consequence, three or four of the medical schools in London have drafted schemes for the experimental application of the unit system. The directors will be whole-time officers, debarred from private practice, and each will have the help of an assistant director, a first and a second assistant, and two house-physicians or house-surgeons. The units will be provided with wards, with clinical laboratories and out-patient departments. A large part of the annual expenditure involved in the re-construction has been provided by the Board of Education. The units will take their share in the treatment of patients and in the clinical teaching of the hospital.

TUBERCULOSIS OF THE KIDNEY AND URETER

By Warner Jones, F.R.C.S.

AND

Major Robin Pearse, F.R.C.S.

Department of Urology, Toronto General Hospital

RENAL tuberculosis first began to interest surgeons in a practical way when Bryan in 1870 removed a tuberculous pyonephretic kidney without recognizing it as such. In 1872 Peters repeated the operation, mistaking the condition for calculous pyonephrosis. In 1882 Koch discovered the tubercle bacillus, and in 1883 Babes recovered tubercle bacilli from the urine.

In 1885 Gross was able to collect reports of twenty nephrectomies with eight deaths. The mortality in the years immediately following was so high that many eminent surgeons questioned the propriety of nephrectomy for tuberculous kidney.

Between 1890 and 1900 the master surgeons Tuffier, Morris, Israel, and Albarran were foremost in bringing the profession to accept the view that nephrectomy is the correct treatment for primary renal tuberculosis.

It was during this period that cystoscopy and catheterization of the ureters became of practical value. Since that time, mechanical and technical improvements in cystoscopy have made the diagnosis of renal conditions more exact and have placed kidney surgery on a scientific basis. So much is this the case that at the present time no surgeon is justified in doing kidney operations until a cystoscopic examination has been made and the relative function of the kidneys established.

The pathology of renal tuberculosis has been so amply described in current text-books, that it is needless to take up time in recapitulation.

We considered it would be of more interest to deal with it from the clinical standpoint, and to emphasize certain diagnostic

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points with a view to the earlier diagnosis and consequently more effective treatment of the disease.

In the early stages primary tuberculosis of the kidney is unilateral. Israel estimates the disease to be unilateral, in early cases, in the proportion of nine to one. Kronlein gives 92 per cent. and Legueu 85 per cent. of unilateral early cases. These figures are supported by the findings from ureteral catheterization and from the results following nephrectomy.

Late cases are almost invariably bilateral; it follows, therefore, that an early diagnosis and removal of the diseased kidney offers the best chance of a cure.

Symptoms.—The most prominent and often the only symptom of tuberculosis of the kidney is frequency in micturition; that is to say, that the symptoms all point to the bladder rather than the kidney as the seat of the disease. It is obvious that in every case of marked bladder frequency the probability of renal tuberculosis must be considered. In the more advanced cases, frequency is associated with pain as a result of bladder involvement. Hæmaturia, small in amount, is present in many of the advanced cases, where there is involvement of the bladder mucosa. Occasionally profuse hæmaturia, due to renal congestion, may be the initial symptom. Albuminuria is often present before the urine acquires the characteristic milky colour indicative of the disease. Pain in the loin may or may not be present and is due either to renal congestion or stoppage of the ureter by blood clot, inspissated pus or caseous debris. Enlargement of the kidney is not present in the early stages of the disease, but tenderness may often be elicited on palpation. A well defined tumour would indicate a hydro- or pyonephrosis.

A rectal, and in females, a vaginal examination is very essential as the thickened ureter may frequently be felt on the anterior wall or lateral fornix. Kelly found thickening of the lower end of the ureter in 75 per cent. of his cases; he does not consider this as an absolutely diagnostic sign but only highly suggestive.

Diagnosis.—Given a case of suspected tuberculosis of the urinary tract, the following is the procedure which we adopt to arrive at a diagnosis. A careful personal and family history is taken and a systematic physical examination made of the chest, abdomen, glands and generative organs. If possible, the chest should be reported on by a physician. The urine is next examined for reaction, albumen, bacterial and cellular deposits. A careful search must be made for tubercle bacilli; this may have to be re-

peated several times; failing twenty-four hour specimens, the morning specimens are preferable.

A cystoscopic examination should be made, special attention being paid to the ureteral orifices. In early cases the cystoscope may not show any bladder changes sufficient to indicate kidney disease. In more advanced cases, definite lesions on or around the orifice on the affected side will be found, varying from a slight œdema of the lips to typical miliary tubercules, ulceration, and finally scarring and contraction, producing a golf hole orifice which is frequently dragged out as a result of shortening of the ureter due to inflammation of the extravesical portion.

The bladder changes may be confined to the ureteral orifice on the diseased side, or there may be scattered patches of miliary tubercle or actual ulceration surrounded by œdema. A generalized tuberculous cystitis with marked œdema may be present, so much so as to render a cystoscopic examination a very difficult or impossible procedure. These spasmodic bladders will only hold one or two ounces of lotion even when the patient is under a general anæsthetic.

A difference of opinion exists among cystoscopists as to whether both ureters should be catheterized, some holding the view that only the diseased side should be catheterized, while others think it more important to catheterize the sound side with a view to establishing its freedom from disease and its ability to carry on the urinary function should its diseased fellow be removed. Personally we incline to the latter view and accordingly catheterize both ureters attending to the sound side first.

In cases where one finds it impossible owing to general cystitis with œdema to locate the ureteral orifices, a few days' rest in bed and th administration of some bladder sedative may diminish the cystitis so that the ureteral orifices may be found and catheters introduced. The intramuscular injection of indigo-carmine will facilitate the search for a hidden orifice. In some cases only one ureter may be seen or again both may be seen and only one admit a catheter; in this case a Garceau catheter should be used and the urine, if any, from the other side collected transvesically; failure to obtain urine from one side may be due to one of three causes, viz.: temporary inhibition, blockage of the ureter by pus debris or scar tissue, or congenital absence of the kidney.

Kelly and Burnam state that in 50 per cent. of their cases there was marked tuberculosis about the ureteral orifices. In 15 per cent. the disease was about both orifices, but in half of these the

disease was limited to one kidney. In eleven cases where there was only slight tuberculosis around a single orifice, this orifice was invariably that of the diseased side.

In a series of one thousand cystoscopic examinations at the Urological Clinic of the Toronto General Hospital, there were fifty-six cases of proved tuberculosis of the urinary tract, of which six were bilateral, There were four cases of closed ureter on the right side and one on the left. The bladder was involved in 50 per cent. of the cases.

In doubtful cases where the bacillus was not found in the urine, guinea pigs were inoculated and proved to be positive in about 8 per cent. of the cases.

Among three hundred and fifty cystoscopies done by Major Pearse in military hospitals at Salonica and Basingstoke, ten cases of renal tuberculosis were found.

The guinea pig test is of great value where tubercle bacilli have not been found in the urine and it is our practice to have guinea pigs inoculated in all cases of renal hæmaturia where the bacilli have not been found. We think this is important, because it has been considered by some surgeons, good surgical practice to explore a kidney in order to investigate the source of hæmorrhage. We think this should be done only after tuberculosis of the organ has been excluded, as there is great danger of causing grave perirenal infection with tuberculosis by this procedure. In this connection it may be well to mention that a good pyelogram will afford valuable help in differentiating between hidden renal tuberculosis and a malignant kidney, and will also show the extent of destruction.

A relative function test should be made with phenol-sulphonphthalein or indigo carmine or by examining the relative excretion of urea or creatinin.

It may happen that a tuberculous nephritis is present on one side and a toxic albuminuria on the other. This does not contraindicate removal of the tuberculous kidney, provided the function of the non-tuberculous one is above the safe limit, because when the tuberculous organ is removed, the toxic albuminuria will disappear.

Prognosis.—Tuberculosis of the kidney tends to progressive destruction of the organ and eventually in the majority of cases the bladder and the other kidney become involved. The average duration of time until the kidney is completely destroyed is about five years.

The bladder is usually involved by the second year, but bladder

involvement may occur even earlier. Rafin in the *Journal D'Urologie*, 1912, states that the average duration of life for these patients is four and a half years; 16 per cent. of the cases die between five and ten years; about 2 per cent. survive ten years. The only known cases of spontaneous cure are where the kidney has been totally destroyed and the ureter occluded.

Albarran examining one hundred and three specimens of tuberculosis of the kidney found sixteen with occluded ureter. We had one case where the kidney was converted into a thin walled sac containing clear fluid; there was not a particle of kidney tissue left. The ureter was absolutely closed above and below; careful examination revealed one small patch of tuberculous ulceration in the wall of the sac.

Treatment.—The only satisfactory treatment for renal tuberculosis is operative and from what has been stated, and from the pathology of the disease, it is obvious that the earlier the operation is performed the better will be the result. The best results from operation are obtained when the disease is limited to the kidney, or where the bladder is only slightly involved. Where there is extensive involvement of the bladder, the results from operation are not nearly so good, the patient's life will be prolonged, but the bladder symptoms may not entirely clear up; but where the bladder is only slightly involved, the removal of the diseased kidney will result in resolution of the bladder lesion.

In the early days, nephrotomy was considered a rival of nephrectomy, but at present a nephrotomy is only performed where a pyonephrosis requires urgent relief and the condition of the patient denies nephrectomy.

Nephrectomy with partial removal of the ureter is the operation most commonly done and is sufficient in most cases to effect a cure. In a certain percentage of cases, however, the frequency and urgency still persist and it becomes necessary to remove the remaining portion of the ureter with the hope of relieving the distress. From the fact that in the majority of cases the lower end of the ureter is markedly involved, and also from the fact that partial removal of the ureter sometimes leaves a persistent sinus in the loin (which in one of my cases led to the formation of an intractible fæcal fistula eighteen months after removal of the kidney), one is almost forced to the conclusion that it would be wise to remove the ureter completely with the kidney, whenever the general condition of the patient warrants the prolongation of the operation.

In a case recently operated upon where there was involvement of the lower end of the ureter together with a solitary ulcer of the

bladder about two centimetres diameter and situated near the apex. I removed the kidney, ureter, and a portion of the bladder wall immediately surrounding the ureteral orifice. I was tempted to excise the ulcer, but thought this would prolong the operation too much; three weeks later I fulgurized the ulcer with the Oudin current per cystoscope, this was followed by complete healing and total removal of the disease.

Legueu in six hundred and eighty cases of nephrectomy for tubercle found a mortality of 7 per cent. Albarran in one hundred and eighteen cases had a mortality of under 4 per cent. Braash in two hundred and three nephrectomies records a primary mortality of 2·9 per cent.

Kelly and Burnam report a primary mortality of 4 per cent. in one hundred cases, and a secondary death rate of 10 per cent. in a period from one year following the operation and including cases operated upon twenty years ago.

The records of the Toronto General Hospital from 1914 to 1918 inclusive, give twenty-one nephrectomies for tuberculosis of the kidney with two deaths. My case records show thirteen primary nephrectomies for tuberculous kidney; two with complete removal of the ureter at the time of the operation. There were no primary deaths. Three were followed by persistent sinus; of these three, one developed a fæcal fistula as before stated; a second developed tuberculous meningitis a year after the operation, the third case owing to persistent irritability of the bladder, had the remaining portion of the ureter removed at a second operation, by another surgeon. The remaining ten cases have continued to show a satisfactory result from a period dating from the present time to five years back.

Ramsay in the *Annals of Surgery*, 1900, vol. 32, page 46, has collected the causes of death in thirty-seven instances following one hundred and ninety-one nephrectomies, fourteen were due to disease of the opposite kidney and in only three of these was there active tuberculosis. Among other causes were shock, peritonitis, septicæmia, hæmorrhage, exhaustion and necrosis of the bowel. According to Kelly, the large majority of primary deaths following nephrectomy are due to insufficiency of the remaining kidney.

Conclusions

Make an early diagnosis. Exclude tubercle of the other kidney. Establish its renal sufficiency and remove the diseased organ with the ureter at as early a date as possible.

INDICATIONS FOR AND RESULTS OF TRANSFUSION

By E. C. Levine, M.D.

Montreal

BEFORE taking up the subject of the application of transfusion to certain diseases, it would perhaps not be out of place to outline briefly the history of transfusion. Reference will not be made to the Egyptian era, although it is believed that transfusion was practiced then. We shall content ourselves with a few historical references to its application as a therapeutic remedial measure in the period from the end of the fifteenth century down to our own times.

In 1492, three youths are said to have lost their lives as a result of transfusion in an effort to save the life of Pope Innocent VIII, who died of a weakening disease (pernicious anæmia). Livavius writes, in 1615, "Let there be present a robust, healthy youth, full of lively blood. Let there come one exhausted in strength, weak, enervated, scarcely breathing. Let the Master of the Art (the operator) have silver tubes that can be adapted one to the other, then let him open an artery of the healthy one, insert the tube and secure it. Let him incise the artery of the patient and put into it the feminine (receiving) tube. Now let him adapt the two tubes to each other and the arterial blood of the healthy one, warm and full of spirit, will leap into the vessels of the sick one, and immediately will bring to him the fountain of life and will drive away all languor."

Occasional mention is made of transfusion having been done from 1492 to 1667; notably, in 1667, by Jean Baptiste Denys, physician to Louis XIV. In the same year (1667) it is reported that Dr. Croone gave a transfusion demonstration at a meeting held at Gresham College, transfusing the blood from one dog into another until the donor died, the recipient living and being shown at the subsequent meeting, two weeks later, to be in good health. At the same time that Denys was doing experimental work in France on dogs and sheep, Lower, in England, was doing similar

work. His method was carried out by the use of quills, one being inserted into the jugular of the recipient, and the other into the carotid of the donor. These were slipped inside one another to allow the blood to flow from donor to recipient. Lower laid great stress on the necessity of opening the opposite jugular of the recipient so as to allow the same quantity of blood to flow out as came in. All these experiments were, until 1667, carried out on animals, principally dogs and sheep. In 1667, Dr. Arth. Coga reports having transfused blood into a patient, the donor being a sheep, by the use of Lower's tube, without any bad result. The patient was first bled seven ounces, and then the tubes were connected up for two minutes, when it was estimated that eight or nine ounces of blood had passed into the recipient's vein; no detrimental after effects were recorded. Then followed a long period when transfusion seems to have fallen into disuse. During the Franco-Prussian war and for a short time afterwards, transfusion came again into vogue.

In 1892, Professor Von Ziemssen reported on the subcutaneous method of transfusion, 300 to 450 c.c. of blood having been given subcutaneously, followed by a vigorous massage for fifteen minutes. This was a very painful method and was soon abandoned. Von Ziemssen then used the syringe method, with much better results—three or four syringes being used for this operation. The use of large calibre needles was advised and blood was drawn from the donor's vein and injected into the vein of the recipient. It is reported that 200 to 300 c.c. of blood were given by this method.

Crile, of Cleveland, in 1909, advocated the use of special tubes (since named after him), by which artery and vein were connected up end to end and blood allowed to flow from donor to recipient. The amount given was regulated by the pulse of the donor. No idea of definite quantity could be obtained by this method. In the same year, Brewer and Leggett used simple glass tubes previously coated with paraffin, which proved a very efficient method, as the flow could be watched, clotting recognized and corrected, an advantage over Crile's method. Bernheim about this time devised silver tubes which would fit into arteries and veins and connect up in the centre.

It was in 1911 that Curtis and Davis, Kempton and Brown, and others, devised a glass tube with paraffin coating and the method of withdrawing and measuring the blood in definite quantities, as now used. The Kempton-Brown tube has this advantage, namely, that the blood could be taken from one patient to the other for administration without any ill-effects.

On April 10th, 1913, before the New York Academy of Medicine, Lindeman reported in a more elaborate manner on the needle and syringe method. In the same year, Unger, of the Mount Sinai Hospital, New York, devised an apparatus which is to-day recognized as one of the best. This apparatus consists of a two-way cock through which saline flows through the unused tube, while blood flows through the other; the order of flow is reversed when the blood is being taken from the donor, thus preventing any possibility of blood clot in the tubes, needles, or apparatus itself. The syringe used is kept cool by the spraying of ether over it, thus reducing the possibility of clotting and allowing free movement of the plunger—the coolness created by the ether overcoming the expansion of the plunger due to the heat of the blood.

About this time, Professor John Abel was doing experimental work with hirudin and sodium citrate as anti-coagulants. In 1915, Hustin, of Brussels, and Weil and Lewisohn, of the United States, published, unknown to each other, articles on the use of sodium citrate. Objections were made at the time to these methods; it was argued that, as sodium citrate and hirudin prevented coagulation, they were contraindicated, as transfusion would only tend to increase the time of coagulation. Practice with these methods, however, has shown that the coagulation time of the recipient's blood, instead of being lengthened, is actually shortened. Of the two anti-coagulent methods, the sodium citrate is the one now most commonly used. The advantage of this method of transfusion is that the blood can be taken from the donor, kept for a certain length of time, and then transfused to the recipient, without any change in the blood. Transfusion by this method can be carried out without the presence of the donor—a factor to be considered when dealing with nervous patients. This method of transfusion is of great advantage to a country practitioner.

The following is a record of cases and results of transfusion carried out by me at the Royal Victoria Hospital:

DIRECT TRANSFUSION METHOD

	No. of Cases		*Results*
Pernicious anæmia.....	27	Temporary benefit.....	25
		Rendered operation of splenectomy practicable.	2
Hæmorrhage.....	4	Improved.....	4
Septicæmia.....	5	Improved.....	2
		Not improved.....	3
Post-operative hæmorrhage (gall bladder).....	3	Markedly improved.....	3
Gastric ulcer (hæmorrhage).....	3	Markedly improved.....	3
Puerperal septicæmia.....	2	Improved.....	1
Hæmophilia.....	2	Improved.....	2
Pulmonary hæmorrhage (T.B.C.).....	1	Improved.....	1
Post-operative shock.....	3	Slight improvement.....	3
Typhoid perforation.....	1	No improvement.....	1

SODIUM CITRATE METHOD

Pernicious anæmia.....	3	No improvement.....	3

Of the fifty-four cases referred to in the above table, the following conditions have shown the most favourable results after transfusion:

Hæmophilia; primary hæmorrhage; post-operative hæmorrhage; conditions of jaundice where surgical interference is necessary; puerperal septicæmia; pernicious anæmia prior to splenectomy.

Very little permanent good was achieved in the administration of blood in cases of pernicious anæmia. Transfusion in such cases appears to have a temporary beneficial effect, which soon disappears, and the patient returns to his or her previous state.

As already mentioned, where splenectomy is to be done, transfusion of blood, prior to the operation, is of benefit in sustaining the strength of the patient.

In the case of pulmonary hæmorrhage referred to in the table a few words of explanation are offered.

The patient was undergoing sanatorium treatment and suddenly developed a hæmorrhage of alarming proportions, so much

so, that the patient was nearly exsanguinated. The donor was a fellow patient about to be discharged from the sanatorium with his pulmonary lesion much improved. Six hundred and forty c.c. of blood were transfused with remarkable results. Hæmorrhage was arrested, the patient improved to such an extent that an artificial pneumothorax was performed a couple of months later. This transfusion took place in October, 1916. The patient has had no hæmorrhage since and is still undergoing treatment at the sanatorium.

Puerperal septicæmia—The first case was one twenty-one days after confinement, suffering from a streptococcus infection, pure cultures having been recovered from the blood. The temperature ranged from 103° to 105°, pulse 70 to 130, with chills, restlessness and delirium. Two hundred and sixty c.c. of blood were given, the donor being the husband. Temperature subsided gradually and chills and delirium disappeared after twenty-four hours. Six days after transfusion, temperature was normal and the patient was discharged from the hospital on the tenth day following transfusion.

The second case was one of extensive phlebitis of the right leg following infection three days after confinement. This case did not react to the transfusion. Death occurred twenty-four hours later.

General Indications for Blood Transfusion.—Transfusion is indicated in all conditions of depleted blood supply, especially where operative measures are contemplated. This fact was very forcibly brought out in the treatment of wounds on the field of battle.

Specific Indications for Blood Transfusion.—Hæmorrhage, primary and secondary; hæmophilia; sepsis; typhoid perforation; puerperal septicæmia; gall bladder conditions with jaundice; gastric ulcer (hæmorrhage); post-operative bleeding.

Hæmorrhage.—In conditions where we have had great loss of blood, such as in traumatic amputations, or extensive wounds where surgical interference is necessary and would entail a certain amount of danger should it be carried out, transfusion of a fairly large quantity of blood prior to the operation is of great benefit to the patient.

Secondary hæmorrhage.—As in the foregoing, this also is benefitted by blood replacement; not only have we to replace a large volume of lost blood, but the transfusion of fresh blood increases the coagulability of the patient's blood, which is of assistance in arresting hæmorrhage.

Hæmophilia.—In conditions of this kind, it is interesting to note the remarkable results obtained from the transfusion of a small quantity of blood. A case in point:

A child was brought to the outdoor of the Royal Victoria Hospital, with a small cut on the anterior surface of his tongue caused by a fall. The mother, who accompanied the child, informed us that the wound had been bleeding ever since the accident happened, twelve hours before coming to us. The tongue was sutured, but the bleeding still persisted. The mother volunteered the information that an older brother suffered from the same condition of bleeding whenever he injured himself. A small quantity of blood was taken from the mother (after tests had been made) and injected into the child's vein. In a couple of hours a hard blood clot, about the size of a cherry, formed at the site of injury. This dropped off in a couple of days, without any further bleeding.

Cholelithiasis.—In gall bladder conditions where there is obstruction with jaundice, general oozing of blood often takes place at the site of operation, with formation of large hæmatomata. In these cases it is very difficult to control bleeding. The loss of coagulability of the blood is nearly always remedied by transfusion of whole blood. The following case is cited in illustration:

Mrs. B., aged fifty-one, suffering from common duct stone and marked jaundice, was operated upon, stone removed and a cholecycstectomy performed. Twelve hours following operation, general oozing of blood took place throughout the length of the incision. The wound was reopened and a large blood clot found in the region of incision. No definite bleeding point could be found, but there was general oozing from the tissues. The patient was practically exsanguinated and transfusion was decided upon in the hope of saving her life. The donor (her son) fainted after 140 c.c. of blood had been given and transfusion was stopped. The following day the same donor again volunteered, and this time 400 c.c. were given. Six hours following the second transfusion the oozing stopped and the patient made an uninterrupted recovery.

Hæmorrhage from the Stomach in Ulcerations or Following Operation.—The arrest of hæmorrhage is often brought about by transfusion, and depleted circulation restored by a fair quantity of blood being transfused.

Post-Transfusion Reaction.—With the citrate method, one nearly always gets a reaction consisting of rise in temperature, chills and general discomfort of the patient, which, however, sub-

side in a couple of days. Reactions of this kind, but of a much milder nature, have occasionally taken place with the whole blood method. In only one case have I had jaundice come on following a chill and a rise in temperature. Six hundred c.c. had been given to this patient who was suffering from pernicious anæmia. The donor was a tested case. Four hours following transfusion the patient had a sudden chill, lasting one hour; temperature 103° to 104°. The temperature gradually subsided but two days later he developed jaundice. This condition gradually faded away and at the end of one week all symptoms had disappeared, leaving no ill-effects.

In only two cases have I found hæmoglobinuria following ransfusion. Both cases died.

Quantities of Blood to be Given.—In cases where there is no great loss of blood and where the condition is one of toxemia, it is advisable that a small quantity of blood be given, as it is not a question of replacement of blood, but rather one where toxæmia is to be overcome; and also, the heart muscle in these toxæmias shows marked cloudy swelling, hence the inadvisability of putting this organ to any extra strain, where there might be danger of acute dilatation.

In conditions of hæmorrhage in which the circulation has been depleted through loss of blood, much larger volumes of blood could be given without any fear of heart involvement. In ordinary cases, the average quantity of blood given is about 600 c.c. I have given as high as 1,100 c.c. without any detrimental results.

Choice of Donor.—The choice of a donor is a very important matter for the success of transfusions. No blood should be given to a patient without a hæmolytic or an agglutination test having been done. The agglutination test is the simpler, easier and quicker method; its technique is as follows:

Have four small test tubes, two of which are to be used for red cells and two for serum. Mark one of the tubes to be used for red cells "D.R.C." (donor's red cells) and the other "R.R.C." (recipient's red cells). Into these drop 1 c.c. of sodium citrate of strength about 2 per cent. Allow two drops of donor's blood to drop into tube marked "D.R.C." and the same quantity of recipient's blood into tube marked "R.R.C.". Into the other two tubes allow about 4 or 5 c.c. of blood to flow from donor and recipient for the purpose of obtaining serum. Wash the red cells with saline solution three or four times so as to get rid of the sodium citrate. The simplest way to wash these cells is as follows:

Add about 5 c.c. of normal saline to the tube containing the

red cells, shake gently until thoroughly mixed, then put it in the centrifugal machine until red cells are deposited at the bottom of the tube and the fluid is clear above. Decant the clear fluid. Repeat this four or five times until the cells are thoroughly washed.

Take the two tubes containing the blood for serum and put them into the centrifugal machine so as to free the serum from the clot.

Take two glass slides and make a ring with vaseline at each end of the slide. These rings should be about the size of a five cent piece. Mark one end of the slide "D" (for donor) and the other end "R" (for recipient). Add a few drops of saline to the tubes containing the red cells so as to make a homogeneous mixture. With a sterile pipette take one drop of the red cells mixture from the tube marked "D.R.C." and drop it into the circle marked "D" on the glass slide. With another sterile pipette take one drop of the red cells mixture from the tube marked "R.R.C." and drop it into the circle marked "R" on the glass slide. To the drop of red cells in circle "D" on the glass slide, add one drop of recipient's serum. To the drop of red cells in circle "R" on the glass slide add one drop of donor's serum. Mix well with a small glass rod. Add a cover slip and put in the incubator at 37° C. for one hour. In thirty minutes, if any agglutination is to take place, it will be shown under the microscope by the cells coming together in clumps, as is usually seen in a Widal reaction for typhoid. Examine again when the hour is up, so as to make sure of the condition. If no clumping has taken place, the blood is fit for transfusion.

The other test, namely, "The Hæmolytic Test", is much longer as no reading can be done until after twelve hours in the incubator, and unless the case is a non-urgent one, this method is not made use of.

It has been demonstrated that no hæmolysis will take place without an accompanying agglutination; but slight agglutination may take place without hæmolysis. This, however, is not detrimental to the recipient, providing the reaction is not too great.

Of the fifty-four cases reported in this paper, two were transfused without any blood test having been made; there were extreme cases and the exhausted condition of the patients warranted no delay. I might add that both cases ended fatally, one succumbing an hour after transfusion and the other a week later, from pneumonia.

Numerous papers have been written about blood transfusion during the Great War; among the Canadians, Primrose, Archibald

and Bruce Robertson may be mentioned. Marked results have been obtained both by the citrated and whole-blood methods, especially in pre-operative cases, where the loss of blood was the principal factor to be considered. The writers mentioned state definitely that no surgical relief could have been carried out had not the patient been previously transfused. Large quantities of blood were given, the average being about 1,000 c.c. In many cases the syringe method was used.

Primrose, in reporting thirty-eight cases, mentions the fact that in two cases hæmoglobinuria developed, which meant that hæmolysis had taken place, and death followed.

In a number of cases at the front, no blood test was made, the urgency of the condition preventing it, and strange to say, very few ill results are recorded where the test was not made.

I may say, in conclusion, that it is now accepted by the medical profession that great benefit may be derived from transfusion, if it is properly carried out. The excellent results obtained in numerous cases at the front have greatly strengthened our faith in transfusion as a remedial measure.

Where modern methods are used, and ordinary surgical asepsis carried out, there need be very little fear of injurious results. Even if it should happen that transfusion is of no lasting benefit to the patient, it can certainly do no harm and is worth trying.

SPASMOPHILIA

(INFANTILE TETANY)

By Lionel M. Lindsay, M.D.

Montreal

IN presenting the subject of spasmophilia to this meeting, I make no claims to any original work. My reasons for choosing this subject are threefold:

First: That few practitioners seem to recognize the condition, which is therefore not properly treated, often with disastrous results.

Second: That some rather important work has been done within the past year or two, which has a bearing on the ætiology and treatment.

Thirdly: There seemed to be an unusual number of these cases in Montreal this spring, and it is on this series of cases that this paper is largely based.

Spasmophilia may be defined as a hyperirritability of the peripheral nerves to mechanical and electrical stimulation with a tendency to tonic and clonic spasms.

The disease is very common in infancy and is responsible for most of the convulsions of infants from six to eighteen months of age.

The three most characteristic symptoms are:

1. Laryngo-spasm or laryngismus stridulus;
2. Tetany or carpo-pedal spasm; and,
3. Eclampsia, or general convulsions.

Laryngo-spasm is the earliest and most common manifestation, and varies in degree from an inspiratory crowing, only detected by the trained ear, to attacks of apnœa or arrested breathing, often referred to by the mother as "internal convulsions". These attacks are usually precipitated by some emotion or shock, such as crying, laughing, fright, temper, etc., and are not without danger, as the child may suddenly die from heart failure, or may pass into a series of spasms or general convulsions.

Read at the fiftieth annual meeting of The Association, Quebec, June, 1919.

Tetany or carpo-pedal spasm, is much less frequent. The hands assume the so-called obstetrical position, while the feet are held in a position of equinas. The arms and legs are usually rigidly flexed. These tonic contractions may last for hours, and are often painful. Sometimes they are paroxysmal. Edema of the hands and feet may occur, especially in prolonged attacks. Consciousness is not lost, so that these infants often suffer considerably until the spasm is relaxed.

Other groups of muscles are occasionally involved. The face may be affected, causing a mask-like expression. There may be a squint, or opisthotonus. Abt suggests that certain cases of asthma are due to spasm of the bronchial muscles as a result of spasmophilia.

The general convulsions are indistinguishable from those of epilepsy. There is a primary tonic and a secondary clonic stage; then the convulsion subsides, and in two or three minutes the attack terminates in a general relaxation and return to consciousness, and the child appears quite normal.

One attack may follow closely on another, producing a condition analagous to status epilepticus. The number and severity of the convulsions vary considerably. One child may have an occasional isolated attack at rare intervals, another may have ten or twenty in the course of a single day. Relatively these eclamptic seizures are much less dangerous than the severer forms of laryngo-spasm. Fever never occurs in uncomplicated cases, and is always indicative of an associated infection which may have been the means of precipitating the attack.

The differential diagnosis of these attacks is comparatively easy. These children are apparently normal between seizures, but show mechanical or electrical hyperexcitability. There is no fever and no evidence of meningitis or meningismus.

It has been estimated that over 90 per cent. of all cases of general convulsions occurring in infancy are due to spasmophilia, and are not, as usually stated, due to teething, worms, epilepsy, etc.

Many infants have a hyperirritability of the nervous system without showing any of the above manifestations. In them spasmophilia is latent. Nevertheless, they are potential victims of convulsions and spasms, which may be precipitated by fright, fever, improper diet, etc.

It is important and easy to recognize these cases of latent spasmophilia in order that treatment may be instituted, and thus forestall the development of spasms.

There are three signs by which one may discover the presence of spasmophilia, even during the latent period. Any one of them is sufficient to establish a diagnosis. They are:

1. Increased irritability to galvanic stimulation.
2. Chvostek's sign.
3. Trousseau's sign.

1. In the diagnosis of latent spasmophilia the increased reaction to electrical stimulation of the median or peroneal nerve is most important. It is the earliest and most important phenomenon.

For general purposes it may be stated that the presence of a cathodal opening contraction with less than five milliampères of galvanic current may be considered to establish the diagnosis of spasmophilia, while the absence of such a contraction excludes it.

2. This test requires a certain amount of practice and the proper electrical outfit. If one has not the means for making the electrical tests, the Chvostek sign is simple and of great clinical importance. This is elicited by simply tapping the cheek over the facial nerve, which, in the case of spasmophilia causes involuntary contraction of the muscles about the eye or mouth. The peroneal or ulnar nerves may be tested instead of the facial.

Chvostek's sign is not as constant in spasmophilia as is the increased electrical excitability, and it is more valuable in infants than in older children. The presence of Chvostek's sign is sufficient to establish the diagnosis, but the absence of the sign does not exclude spasmophilia.

3. Trousseau's sign depends on the fact that in spasmophilia, compression of the arm or thigh, if maintained for a minute or two, will produce carpal or pedal spasm. Whether this is due to pressure on the artery or nerve is not determined. The procedure is painful and may precipitate a general convulsion. It is the least reliable of all the tests, and should only be applied if electrical apparatus is not at hand and Chvostek's sign is absent.

Spasmophilia tends to run a long irregular course with intermissions and relapses, but as summer advances there is a natural improvement and even a complete subsidence of all signs of disease. Sudden death is always to be feared, and is apparently due to tetany of the heart muscle. It is probable that many deaths attributed to "status lymphaticus" are in reality cases of spasmophilia.

The prognosis should therefore always be guarded, though most cases tend to spontaneous recovery, especially in summer.

The ultimate destiny of these patients is not definitely known, but there is evidence to show that quite a number show signs of

neuropathic taint or of defective intelligence and that only in about one-third is development quite normal.

The ætiology and pathogenesis of spasmophilia are still quite obscure; but certain facts are well established and have a bearing on the rational treatment.

The disease usually affects infants from six months to two years of age. Most cases occur in the late winter and spring months, with a subsidence of symptoms during the warm weather.

Rickets is usually, if not invariably present; indeed since the days of Kassowitz, spasmophilia was usually considered a manifestation of rickets, until recently. Now the two diseases are considered to be quite distinct.

The previous feeding varies from breast-milk to patent infant foods; the greatest number of cases having been fed on high-carbohydrate devitalized foods, typically exemplified by the proprietary infant foods.

The infant is usually pale, flabby and rachitic. The typical carbohydrate "water-baby". Constipation is the rule.

The tendency nowadays is to consider spasmophilia like rickets, a deficiency disease due to the lack or insufficiency of vitamines of the fat-soluble A class. There is much to support this theory, although nothing definite has been settled. Cod liver oil and phosphorus has been the time-honoured remedy since the days of Kassowitz, and we now know that cod liver oil is rich in fat-soluble A vitamines, while phosphorus seems to increase the retention of calcium, so that combined we have a remedy that is almost a specific.

The deficiency in vitamines is associated in some unknown way with a disturbance of salt metabolism, and the normal balance between sodium and potassium on the one hand and calcium and magnesium on the other is upset. In other words, spasmophilia rests on the question of equilibrium between these two groups of alkalies.

Sodium and potassium are irritating to the nervous system, while calcium and magnesium are sedative.

Brown and Fletcher believe that tetany is largely due to the fact that the organism has been storing up fluid in the tissues in combination with sodium and potassium salts.

Tetanoid symptoms may be produced by intravenous injection of bicarbonate of soda, as in the treatment of acidosis; while Grulee produced an increased electrical irritability, by merely feeding sodium and potassium to infants; and I have seen this occur in an infant receiving large doses of these salts for the treatment of pyelitis.

The rôle of calcium has always received much attention. It has been long known that there was a deficiency of calcium in the tissues of the body, and that the feeding of calcium in sufficient quantities would alleviate tetanoid symptoms.

In this connection Howland and Marriott, of Baltimore, have recently made some very interesting observations.

They found that: 100 c.c. blood serum of normal infant contained 10–11 m.g. calcium. 100 c.c. blood serum of rachitic infant contained 8–11 m.g. calcium. 100 c.c. blood serum of spasmophilic infant contained 6–7 m.g. calcium.

In other words, spasmophilia is always associated with a reduction of calcium, and that symptoms may be expected to appear whenever the blood calcium falls below 7 milligrams per 100 c.c.

What produces this deficiency in calcium is not known. It is certainly not due to a paucity of calcium in the food, but rather to defective absorption and assimilation.

Moreover, we can easily raise the calcium content of the blood to normal, with the immediate though temporary disappearance of all symptoms, by merely administering calcium by mouth.

By injecting calcium intravenously, Alan Brown, of Toronto, brought about the same result more quickly; but he found that the calcium curve fell to the previous level with a reappearance of symtoms, about twenty-four hours after the injection.

The magnesium of the blood serum in active tetany is within normal limits. Magnesium, therefore, plays no determining rôle in the production of tetanoid symptoms.

The relation of the parathyroid glands to tetany is not definitely determined. The parathyroid theory depends on the fact that tetany may be produced experimentally in dogs by extirpation of these glands. Although most authorities concur in the statement that these glands play no part in the tetany of childhood, Howland and Marriott have recently completed some work which leads them to the opposite conclusion. These investigators now state positively that the parathyroids exert a profound effect on the circulating calcium, and that symptoms of human tetany are probably caused by a functional disturbance of these glands.

Finally Thiemich and others have emphasized the importance of heredity as a predisposing factor in the ætiology of spasmophilia. Many cases are cited where mother and child had both suffered from the disease.

In the prophylaxis of spasmophilia, breast-feeding stands in the forefront, but in order to insure a good quality of milk, the mother's diet and general mode of living should be supervised.

When breast-milk is not available, cod liver oil and phosphorus should be given in small doses during the winter. If Alfred Hess and others have been able to prevent the development of rickets in negro babies, in New York City, by the administration of cod liver oil, one would expect by the same method to forestall the development of spasmophilia. Personally I have never seen spasmophilia in an infant who had been fed cod liver oil for any length of time, but exact data on this point have not been worked out.

The treatment is most satisfactory and is divided into two stages:

1. The control of convulsions and spasms;
2. The correction of the underlying condition.

In controlling the convulsions and spasms, it must be remembered that these only occur when the calcium content of the blood is below a certain level, and that the calcium may easily be raised above this level, by the administration of calcium in sufficient doses by mouth; but this level is only maintained by the continual administration of calcium, which has no permanent or curative effect.

Calcium-chloride is considered the best preparation, but the lactate may also be used. The usual amount is about one dram per diem given in divided doses, which may be added to the food.

In severe cases with frequent convulsions, chloral and bromides may be necessary at the onset to hold symptoms in check, until the calcium can be absorbed. For this purpose calcium-bromide is a very useful preparation, as it has a double action, while an even more rapid effect is obtained by the hypodermic injection of an 8 per cent. solution of magnesium sulphate (2–4 drams).

An initial cathartic is a rational procedure, for not only are these infants usually constipated, but free purgation drains off large quantities of the irritating salts of sodium and potassium.

For the first day or two the diet should be limited to the use of cereal gruels.

Having now controlled the spasms and convulsions, we next attempt to modify the underlying pathological condition, and if this is due to the deficiency of vitamines we must see that these hypothetical elements are furnished.

The milk of a healthy woman is undoubtedly the best food, and may be said to act as a specific. Failing this, one must have recourse to cow's milk and cereals, suitably modified for the particular infant. Many authorities state that cow's milk should be entirely eliminated from the diet as it is an injurious agent, but in our experience it does not seem either necessary or advisable to deprive a young child of milk for any length of time.

On the theory that sodium and potassium have a causative effect in producing spasmophilia, one would naturally avoid the use of whey.

Finkelstein was very strong in his denunciation of whey salts in this connection, and if this opinion is correct, one would expect good results from the use of protein milk, which is the case. For not only is protein milk free from whey salts, but it is an excellent food for atonic carbohydrate children. Nor is this surprising when we consider the ratio of Na and K to Mg and Ca, in whey, milk and protein milk as shown in the following table:

	Whey	Milk	Protein Milk
Na and K	44·5%	36·0%	21·5%
Mg and Ca	19·3%	23·75%	33·8%
Ratio	2·3 : 1	1·5 : 1	1 : 1·6

In considering diet we must insure a sufficient amount of so-called fat-soluble A vitamines. These we know are present in fresh milk and cream, egg-yoke, and cod liver oil, and these are all suitable for the diet of an infant.

The addition of phosphorus to cod liver oil is the classical treatment of these cases. Schabad and others have shown that phosphorus administered alone causes no increase in calcium accumulation in the body, but when combined with cod liver oil, there was a marked retention, which was greater than when cod liver oil was used alone. One half to one drop of freshly prepared oleum phosphoratum (B.P.) is the usual dose.

Calcium retention is also favorably influenced by the use of malt extract. This was recently worked out by Akira Sato at the Johns Hopkins University.

Finally we must not forget the beneficial effect of sunshine, fresh air, and general hygienic measures in the treatment of this, as in any other nutritional disturbance of childhood.

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WOUNDS OF THE CHEST

By Lieutenant-Colonel N. B. Gwyn

and

Major H. E. MacDermot, C.A.M.C.

PART I.—Introductory Remarks by Lieutenant-Colonel Gwyn

IN the early days of the war, we were brought into contact with Sir John Rose Bradford and Sir George Makins, who showed us the importance of accurate chest-work; their presence as consulting physician and surgeon respectively was a never-ending source of comfort to us in our earlier struggles with the problems presented. Under Colonel Finley, consulting physician to the Canadian Forces in England, and former chief physician to No. 1 Canadian General Hospital, we commenced our first work of any consequence as the services increased, and to him we feel that we owe a debt of gratitude for his careful instruction in the many new conditions which war wounds of the chest brought out.

To the many assistants who have worked with me, to the nurses who carried out the work in the strenuous summers of 1916–1917, I give my hearty thanks. Without their willing work and untiring energy, the handling of several hundred heavy cases in tents could never have been accomplished.

Before taking up the more technical part of the programme, a word might be said in passing as to the system which has allowed us to collect so easily the many cases forming the basis of Major MacDermot's statistics.

Previous to the summer of 1916, wounds of the chest were scattered indiscriminately over the hospital. After the first few days of the Somme offensive, I realized that some form of segregation must be practised. Accordingly it was arranged that all chests should enter one main ward, and be distributed from there,

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the ward being under the supervision of the medical chief. Simple cases requiring a minimum of dressing and perhaps needing aspiration only, were transferred at once to the medical chest ward, where they remained under observation. Many of these came to operation as time went on.

To allow the greatest number of medical officers to reap advantage from the work, we used a different surgical ward every four or five weeks, while in our one medical hut ward we instituted a rotation of the officers best fitted to carry on a service of such importance. Without the hearty co-operation of the surgical staff, the plan was bound to fail, but from Colonel Gunn we received active support, and the century-long dispute of the civil hospitals as to whose service an empyema belonged, found no supporters on either side. The laboratory, under Major Ower, was untiring, and a rule early made, that an infected fluid was to be reported on at once to one or other of the heads of department, who should arrange immediately for operation, saved countless hours and many lives. Our work last year was continuous and difficult; this year the foresight of Colonel Wylde, and the generosity of the Red Cross, has given us a hutted main admitting ward, and our problem has been less difficult. Surgical work in tents will always be unsatisfactory, if from absence of light alone. Our 1916 records were somewhat sketchy, and were materially interfered with by my three months' enforced absence, during which time plates and charts went to England. Our 1917 collection of cases has been marvellously collected by Major MacDermot, and leaves little to be desired. We make no comparison, remembering the different conditions under which we all work. A moment's reflection of course, tells one that we deal with cases passed by the casualty clearing station as favourably progressing. After Major MacDermot has given you our figures, if I may be permitted, I will briefly take up some of the interesting conditions which struck us during our study of the cases.

PART II.—Notes on Chest Wounds by Major MacDermot.

The object of my share of the paper is to present some of the points brought out in the cases of wounds of the chest, which have passed through our wards from April to December, 1917.

The series has been limited to wounds which have actually injured the lung substance, and the total number is a little over four hundred. Of these, we have sent three hundred and fifty to

England, and while their future is another matter, it may be said that they were all at least well on the road to recovery. We have heard from forty-one, of whom twenty-one still have the missile in the lung, and thirty-one are on active duty. None have so far reported any further trouble with the retained missile. It is too soon, and we have not sufficient figures, to form anything like definite conclusions in the matter; but the evidence we have all tends to support the view that the lung substance shows great toleration of the retained missiles. A considerable length of time must be allowed to elapse to permit of clear judgment, but some interesting figures have been published on the later histories of these cases. Colonel Rudolf gives a series (*The Lancet*, November 10th) of fifty cases with retained missiles, only one of which developed abscess; one other was operated on for removal of the bullet. Both died. Colonel T. R. Elliott (*Lancet*, September 8th) reports after-histories of fifty-one cases progressing favourably even with retained missiles. Our own series shows that of two hundred and forty-eight cases in which the foreign body was still in the chest, only eighty-eight developed infection while under our observation.

Deaths, from all causes, numbered fifty, inclusive of some very severe wounds, which were seen to be fatal from the outset. The development of hæmothorax, although of variable extent, was practically a constant accompaniment, but only one hundred and seventeen developed infection. Of these, as might be expected, by far the greater proportion were shell wounds, due of course to the carrying into the tissues of more infective material as clothing, hair, etc., and the more extensive damage done by the irregularly shaped missile. It must be remembered, however, that the majority of wounds were caused by shells, there being two hundred and sixty-eight, against one hundred and twenty-eight from bullets. One hundred and ninety-seven cases were discharged with the foreign body still present, including those which had been operated on; in only forty-one out of eighty-eight operative cases was it removed.

The notes, of course, are not always complete. The base hospital in France acts usually as an intermediate stage. A great deal of very valuable experience has been gained, however, and has been of the utmost value in the treatment of these wounds. It will be better to refer only very briefly to the various interesting conditions which have been met with, and to take up in more detail the general methods and difficulties in the handling of the cases.

Wounds of the chest are best divided into two main groups; those in which the foreign body is still retained, and the through and through wounds. Obviously, the importance of the classification depends on the greater likelihood of infection where the missile is still in the tissues, but of the one hundred and seventeen infected cases mentioned, twenty-nine were through and through wounds, so that the possibility of infection here must not be lost sight of. Occasionally it is difficult to decide if there is a foreign body present; there may be more than two wounds, and the *x*-ray may not show the missile. We have notes of a case in which a dense shadow in the lung proved to be a calcified gland.

It is on the infected cases that one's interest is chiefly centred. The infective agents are various, and in the case of the gas bacillus are associated with interesting clinical signs. Our series shows the following identified single forms: streptococcus, staphylococcus, bacillus æogenes capsulatus, and pneumococcus, with one case of enterococcus. Of these, the pneumococcus and the streptococcus seem to be the more virulent, as the following table will show.

Strepto-coccus	Staphy-lococcus	Bacillus Ærogenes capsulatus	Pneumo-coccus	Mixed (strep-tococcus usually one of the group)
21 cases	11 cases	15 cases	2 cases	19 cases
8 deaths	2 deaths	5 deaths	2 deaths	9 deaths

Staphylococcus and bacillus ærogenes capsulatus infections are often mild in course of development, but our rule has been that where streptococcus is found to be the infective agent, the case is to be treated as an emergency, and is to be opened at once, whilst with the others the urgency may be considered as not so great. There are cases in which the infection is early and obvious, and others in which there is no sign of any infection at any time; but between these lies a great host in which the diagnosis requires time, observation, and constant examination. Most of these men reach the base with no very acute symptoms of distress—dyspnœa, pain, and hæmorrhage—the symptoms which must be most familiar to the regimental and casualty clearing station surgeon, and even where we have met with these early symptoms, it has been our experience that after a day or so there is a most striking disappearance of what, at first, has seemed so acute and alarming. I men-

tion this, because this distress may sometimes seem to call for operative procedures that are not really indicated.

We *are* familiar at the base, however, with acute respiratory distress in the later stages of the case, and have reached the conclusion that infection rather than physical embarrassment of the heart and lungs is at the bottom of it. We have come to regard it as one of the clearest indications for exploratory puncture.

Methodical examination of the chest by the classical means of inspection, palpation, percussion, and auscultation, is indispensable. With this must go observation from day to day.

To confirm and strengthen the evidences obtained from all these, we employ frequent puncture and examination of the chest contents, and too much stress cannot be laid on the value of this form of examination. In a few instances it may not give results, but if it fails to detect a later proved infection, it is fairly certain that it has not been employed thoroughly enough. To puncture early and often is the means of saving many a life.

A difficulty that one meets with frequently in puncturing is that produced by adhesions. If the general indications of fever and pulse are urgent, and the puncture shows sterile or no fluid, there should be no hesitation in making a number of other punctures in different parts of the chest. Case after case can be quoted in which, of two or more punctures done at the same time on a chest, only one showed the infection, the reason always being that the infected fluid was walled off from the rest of the effusion by adhesions or was in a pocket by itself in a firmer part of the exudate. Finding sterile fluid is not enough to determine the absence of infection, for there may be two very different kinds quite close to each other.

It is not enough either to determine merely whether there is infection present or not. One must try to find the infection as early as it is humanly possible to do so, for the medium in which it is developing is so favourable, that often it is only a matter of hours before the degree of sepsis becomes fatally severe. The safest course is to regard all chests with infected contents as emergency cases, and to thoroughly drain as soon as possible.

Where there is no infection, we consider that by ten days, aspiration of effusions should be regularly performed. Occasionally a very small effusion seems to clear up quite satisfactorily without aspiration, but anything occupying one third or more of the back or any given area, should eventually be aspirated. The benefit of allowing the lung to re-expand as early as possible is considerable.

The effusion itself practically always consists of a thin sero-hæmorrhagic fluid, and in passing I may remark on the surprising quantities found in the pleural sac. One case was relieved of 2,700 c.c. by different aspirations in ten days, and still showed signs of some fluid; and in two other cases, 1,600 and 1,800 c.c. were withdrawn at one time. The aspiration may occasionally be resorted to simply to relieve embarrassment of the heart, but there is need for care in the removal of large quantities too quickly or too early. It is a very useful practical point to stop the flow on the very first sign of coughing or irritation. Another very frequent warning of pleural irritation is a sharp pain in the region of the shoulder.

After a large quantity has been withdrawn, 500 c.c. or over, there may be a replacement by oxygen into the pleural sac (Parry-Morgan apparatus), or the two operations can be carried on simultaneously. This is a safeguard against the sometimes alarmingly acute distress, faintness, weakness and rapid pulse, brought on by the too precipitate removal of large quantities of fluid.

Apart from the mere surgery of the chest, the puncture, aspiration and final operation, there are many features in a chest service of intense interest. To the medical man the physical signs of the chest are extremely absorbing, and their range is wide and varied. There is, for instance, the retention of resonance in Traube's semilunar space in even large effusions, the explanation of which seems most probably to be that the effusion in the case of a wound is sudden and limited, compared with its gradual formation in ordinary pleurisy, the lung promptly limiting adhesions in the area of injury.

Much the same explanation may be given to account for the absence of moveable dulness, unless air is also present. As an instance of the marked signs that may develop, I may quote a case of pyo-pneumothorax, in which the succussion splash was clearly produced by the heart action in a series of waves. Again, the effusion in hæmothorax shows often a level line in the *x*-ray in place of the inverted S-curve, with which one is familiar in ordinary pleurisy.

Emphysema of the tissues, while fairly often met with, is not perhaps so frequent as might be expected. It is a sign of minor importance, and always disappears quickly, but may cause some confusion in making the routing examination, both in percussion, where the note becomes quite altered and distorted, and in auscultation, where the crackles of the crepitant tissues interfere with the breath sounds.

The frequency with which tubular breathing and physical

signs of consolidation occur in these effusions, was one of the early surprises of the war, and there seems no doubt that many cases showing these signs were diagnosed quite wrongly.

Pneumothorax has been of fairly frequent occurrence in our experience, and has not seemed to produce any very serious symptoms, although the initial dyspnœa which accompanies it is very severe. The condition developed in one patient when he had been several days in the ward, following on a fit of coughing. From the aspect of infection, it is important to ascertain that the signs of air in the chest are not being produced by gas-forming bacilli. In such cases the signs are usually progressive.

Complications are frequent and important, broncho-pneumonia, lobar pneumonia, septicæmia, pericarditis, etc., but these can only be referred to in passing. Our autopsies, which have been mortifying at times, have been extremely helpful and instructive. They show especially the devious paths the missiles may take, sometimes passing out of the chest region altogether and lodging in the abdomen. One patient was admitted with a shrapnel wound high up in the left axilla, with symptoms of a small empyema in that region. This was drained, and in a day or two a fæcal fistula established itself through the wound. The post mortem showed that the missile had passed down through the lung and diaphragm, through the spleen, and had finally lodged in the colon.

But in no one particular are the post mortem examinations more instructive than in showing the necessity for as complete drainage of the chest as is possible. One realizes at once the large extent of infected chest wall and lung that must be allowed to get rid of its discharges. Again, it gives one an idea of the formation of the adhesions which may prove so confusing, bringing up the question as to how far the surgeon should try to free the lung at the time of the thoracotomy. Some of these adhesions are so dense and strong that the lung would probably suffer too much damage in their breaking down; certainly they impress on one the need for careful examination of the chest at the time of operation.

PART III.—By Lieutenant-Colonel Gwyn.

Of the many conditions seen in connection with wounds of the chest, I have chosen four upon which short notes might be made, both from their clinical interest and from their importance as regards the patient's welfare.

No. 1. Fever without discernible infection of exudate.
No. 2. Late infection of the exudate.
No. 3. Collapse of the lung, either on the wounded side, or, what occurs much more frequently than is recognized, massive collapse of the lung on the opposite side.
No. 4. Undetected collections in the already opened chest.

No. 1. Fever without discernible infection of the exudate. As a rule, wounds of the chest, with an effusion not as yet infected, show some degree of fever. It may be very transient, but is usually of several days' duration.

We may take it that in many instances the fever is due to some local easily recognizable condition, such, for instance, as infarction of the lung about the wound, broncho-pneumonia, pleurisy, pericarditis, suppuration about a missile or its track; but there still exist cases which are not so easily explained, cases which show nothing but the sterile exudate (though one must admit that we are quite unable to say what is going on about the embedded missile). The series includes cases of penetrating and through and through wounds, the most protracted one being of the latter type. Such protracted fever is not easily explained. As causes of it, we suggest infection of the track or clot, eventually overcome, a septic broncho-pneumonia, traumatic pleuritis, a lighting up of an old tubercular focus, or a fever of absorption. None of these points are easy of proof. A steady and persistent hunt for an infected area in the exudate should be carried on. Mere removal of the exudate does not always stop the fever. We have been tempted in the past to open such chests on the chance, and our most protracted case was sent for operation after three weeks of fever, but luckily evaded it. Careful observation, frequent punctures, and retention in hospital till a normal temperature was reached, was our procedure in these cases.

No. 2. Late developed infection of an exudate. Troublesome and more dangerous, since they are often put aside as well, are those cases in which fever, due to infection, developed later in the course of convalescence. We have had many such, and the charts show how innocent the early days in hospitals may be, and often how strenuous the hunt for infection, as for instance absence of fever, for ten days; or secondly, numerous punctures before finding the infection. The causes generally ascribed to such late infections are several and various. Blood effused in great quantity in a serous cavity retains its protective power in large part, and

an infective organism in the centre of such exudate must not only have a focus of dead tissue to start with, but must overcome the actively phagocytic blood. These bloody exudates frequently show organisms in the white blood cells which refuse to grow on culture. When the protective power dies with the disintegration of the blood, the infection, if still lingering, may start out vigorously. The infection deep in a clot will naturally have a firm wall to liquefy before breaking into the general effusion, and may take many days

A more theoretical reason is given in some of the gas bacillus cases, viz.:—that the air leaked into the chest inhibits their growth. Other causes may undoubtedly exist. The infection from within the lung by pneumococci is not infrequently seen.

No. 3. Collapse of the lung, either on the wounded side, or what occurs much more frequently than is recognized, massive collapse of the lung on the opposite side.

Isolated as we are, and away from works of reference, one hesitates to approach the third heading. Collapse of the lung is at once the most interesting of the complications, and the one most needing quick appreciation of conditions. In civil practice one occasionally sees acute collapse of a lung lobe if a main bronchus blocks by a sticky exudate, as in pneumonia. The condition generally spoken of as ether pneumonia, and found to be more frequent after an abdominal operation, is in many instances not consolidation, but a massive collapse of a lung, and is a more or less urgent affair. Both these types of collapse differ from the slowly developing process seen in simple increasing effusions, and are more to be compared with pulmonary collapse, as you may have seen it in your chest cases. Two well defined forms are seen. Collapse of the lung on the wounded side, and collapse of the lung on the sound side, contra-lateral collapse. With both of these, you of the advanced lines are more familiar than we, and we will welcome instruction in regard to them. All of us must have had active experience with cases which some hours after a moderate exudate had formed, were seized with sudden increasing respiratory distress. Examination is always difficult, but a comprehensive sizing up may speak volumes. The formerly fairly full resonant upper chest is now flattened and retracted, the voice and breath sounds either obscured or exaggerated, and often not giving much aid in diagnosis. Increased pressure from late bleeding was the most frequent diagnosis, aspiration the usual treatment, and no immediate relief, the usual result. After the first stormy hours, careful observation

not infrequently showed that with a left sided hæmothorax, the heart was not displaced, or was even to the left of normal; that with a right sided wound it was perhaps to the right of the sternum. The deduction is obvious, for only a collapse of what was left of the lung could give such a condition. The aspiration had also given some indication of an unusual state of affairs, viz.:—a very small amount of blood. Just as interesting and urgent are the remarkable instances of so-called contra-lateral collapse, in which with a wound or effusion on one side, there is an associated massive collapse of the opposite lung. In an enormous number of our chests, the note is made, "small area of broncho-pneumonia or collapse of opposite base," and any suggestion of consolidation on the side opposite to the wound should always be suspect.

When the condition is once established, the patient is seriously ill. An inclination to do something is strong. One patient barely escaped having his chest opened. The retraction of the whole chest and the drawing over of the heart and mediastinum to the now dull flat side are the essential features in the diagnosis, plus the signs of consolidation, rather than those of fluid.

Left alone, the cases did remarkably well. My six cases all recovered.

A few typical examples of the types of collapse might be given.

1. Collapse of lung, almost total, on the wounded side. Through and through wound from right back upper to mid-sternum. Fracture of sternum at junction of gladiolus and manubrium; severe dyspnœa; signs of consolidation of right lung in all save upper lobe. This was more probably collapse, as the heart was displaced to the right of the sternum, the chest sunken in and repeated punctures were negative.

2. Contra-lateral collapse with contour wound. Gouge wound of some depth in right axilla and back, since the patient coughed blood, and had severe dyspnœa at onset. Twenty-four hours later the right lung, as far as could be examined, was clear. It is quite probable, of course, that there was some infarction at the site of the wound; extensive area over left lower lobe, where vocal fremitus was exaggerated, dulness was marked, and bronchial breathing with bronchial voice sounds were present. The heart was drawn well to the left; the point of maximum impulse was in the anterior axillary line. Signs persisted for four days, after which patient improved, and all indications of pulmonary involvement disappeared.

3. Contour wound; contra-lateral collapse. Wound low in left back four days previously. Patient coughed blood, and was

dyspnœic at the time. Cough and dyspnœa increased. On examination, left front full and moving actively. Right front was sunken and barely moved. Heart impulse was well to the right of sternum in third and fourth interspaces. Vocal fremitus was increased in left front, axilla and back, and there was a small area of harsh breathing towards the upper back. Sounds were somewhat distant below, and there seemed to be a slight effusion. The whole right chest was retracted. Vocal fremitus was diminished in front, but was well marked behind. Percussion note over the right upper front had a wooden tympany. It was dull in axilla and back. Sounds were distant in the upper front, were tubular with nasal voice sounds in axilla and the whole back. Completely cleared. Went out with no sign of fluid in either chest.

4. Penetrating wound; contra-lateral collapse. Case of shrapnel wound of the back, missile entering the left side at the lower back about the ninth interspace. Three days later very dyspnœic, temperature 101°, pulse 120, respirations 40. Diagnosis had been made of fluid in large amounts in right chest. There was effusion in small amount at left base, the heart was well to the right of the sternum, the left front expanded actively; the right front was almost motionless, the right chest was solidly dull, vocal fremitus was present everywhere except at extreme base, sounds were everywhere loud, clear, tubular, with bronchial voice sounds. A week later resonance had returned over the whole right lung. Vocal fremitus was now present at the base; many moist râles; sounds loud and blowing.

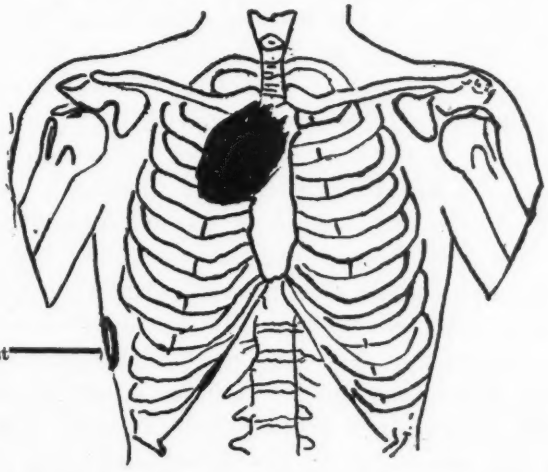
5. Through and through wound, with contra-lateral collapse. Wounded through the first interspace, left, one inch from sternal border to an exit just external to spine of scapula, one week ago. Bled freely from his lungs, and lay on the right side. There was a small hæmothorax on the left side; heart impulse one inch to the right of sternum; the lower half of the right chest was dull; vocal fremitus was present; tubular breathing heard everywhere. There was but little fever. Three days later heart in place; right lung completely cleared; the small effusion seemed to have disappeared from the left base.

In two cases the wound was of the contour or graze type. In four, real damage had been done to the lung or chest. The treatment was largely in the diagnosis, plus rest and a little morphia.

To give a satisfactory explanation of these types of collapse on the wounded and unwounded sides respectively, is beyond us. In the first one, if a man has a deep chest wound, it is to be remem-

bered that the diaphragm goes into a state of spasm midway between inspiration and expiration, aeration of the remaining part of the lung will be materially interfered with, and if the man with a wounded lung is laid on his wounded side, blood may get into and clot in the bronchi, completely blocking them. In the same line he may bleed over to his sound lung. This is, however, unlikely and certainly does not occur when there has been merely a graze or contour wound. The contour wound type, of course, can disprove any contention that it is due to pressure from accumulation of fluid on the wounded side, with pushing over of the mediastinum. Some of us are inclined to ascribe it to a reflex action. Physiologists whom I consulted could give no suggestions.

No. 4. Undetected collections in the already opened chest. On this final title, I have but a few words. I have often thought that a paper on the landmarks of the open chest would be even more instructive than interesting, for we too often assume that a chest once opened is finished with as far as possibilities of accurate physical examination is concerned. The chest above an empyema opening may frequently be the seat of an untouched or late forming effusion; may even have a pyo-pneumothorax of its own, with all the classical symptoms. A chest once opened, and draining,



presents some difficulties in examination and diagnosis, but after some consideration one feels that a few cardinal points in diagnosis stands out. If the chest is one large cavity, with a collapsed non-functionating lung, and a freely opened wound, it is naturally resonant everywhere, and the hollow-barrel like sound on coughing or in drawing air in and out of the wound, is everywhere clearly

evident. The dulness and bronchial voice sounds ascribed to the collapsed lung, and usually placed at the apex, are by no means regularly found, its point of election seems to be more between the spine and the upper scapula, and one should always be suspicious of dull areas in front, in the axilla, or over too extensive a district in the upper back. We puncture now in any interspace, front or back, over any area of dulness in these open chest cases if the patient does not progressively improve. In one of our recent cases, careful examination gave a small area of dulness projecting into the open chest as indicated, and in this small pocket, active streptococcal fluid. A second case was successfully punctured in the inter-scapular area, physical examination having shown resonance in front, and slightly impaired resonance behind. The *x*-ray had shown a large convincing shadow in this case.

A final word on treatment. Observation is the great essential. Major MacDermot has given you our general rules; recently, great progress has been made by the casualty clearing station surgeons in early mopping out the pleura, removing fragments of bone and tissue, sewing up the torn lung and closing the chest. Such interesting work does not come to the base hospitals under the present method of surgical distribution. We see the after course of many of them, and realize that a great step in advance has been made. Fully 40 to 50 per cent. of these cases require no further treatment at our hands. There is an active discussion at the base hospitals to-day upon the advisability of washing out and sewing up a late infected chest, the procedure being—operation, thorough cleansing, following by a daily aspiration, the latter being held to even if re-infection appears. I find there are many opposed to the procedure unless all cases are in the hands of skilled observers. Our own experience has not been encouraging; of two most favourable cases, one coughed out his stitches, quickly infected the re-accumulating fluid, and died of a spreading cellulitis in the tissues of his back; the second soon became badly re-infected, although for two days no living organisms were found in his accumulating exudate, was re-opened, but died of a diffuse broncho-pneunonia. The many good operators who are advocates of the procedure bear witness to its feasibility, and it is too early to sit in judgment.

Before closing, we wish to thank you for the privilege of presenting these details. They belong to an interesting side of our work, and more than interesting, important, because a well handled chest may be, not only a successfully treated patient, but a sound man, ready to take up work again in whatever state of life it may please the authorities to call him.

THE PROBLEM OF THE MENTALLY DEFECTIVE IN THE PROVINCE OF QUEBEC

By Gordon S. Mundie, M.D.

Associate Medical Director, Canadian National Committee for Mental Hygiene

FOR centuries the world has been faced by the problem of what to do with those persons who are born into the world with a mentality below the average human being. The pendulum in the treatment of this problem, like all social questions, has swung first one way and then back the other way. At first these poor unfortunates were treated with scorn and derision; there was no place on this earth for them to lay their head. Then, as the pendulum swung the other way, they were called the children of God, nothing was too good for them, but with all this lavishness of treatment no intelligent study was made of their condition nor any attempt made to solve the whole question of mental deficiency, its cause or solution. Heredity and environment have had their exponents as the cause of feeblemindedness and much time has been wasted in trying to solve the problem by fruitless discussion over these two subjects.

Crime, prostitution, illegitimacy and immorality have all been questions which have worried every person who is public spirited enough to want the community in which he lives to be better mentally as well as physically. Very little attempt was made to solve these questions from a scientific standpoint until a few years ago.

Within the last ten years—I mean since the organization of the United States National Committee for Mental Hygiene in 1909—an attempt has been made to try and stop the ever increasing number of feebleminded persons in the United States. This Committee, founded through the efforts of Mr. C. W. Beers, author of "A Mind that Found Itself", has roused the people of their country to the problem of the ever-increasing number of mentally defective, and to the terrible strain and cost they are to the community.

Read at the fiftieth annual meeting of The Association, Quebec, June, 1919.

The question has been attacked from all sides, by educational means, by the formation of clinics to study persons sent by the juvenile courts or other courts, and by the building of splendid institutions where they can be segregated and taught to live a useful and happy life.

Itard, the physician in chief to the National Institution for the Deaf and Dumb at Paris, in the year 1800, was the first person who attempted to educate an idiot. He chose as his subject a boy found wild in a forest, known as the "Savage of Aveynon", and endeavoured with great skill and perseverance to develop the intelligence of this boy. In the end, Itard was convinced that the boy was an idiot and abandoned the attempt to educate him.

In 1828, Dr. Ferret, physician at the Bicêtre in Paris, attempted to teach a few of the more intelligent idiots in that hospital to read and write and to train them in habits of cleanliness and order. Dr. Fabret, in 1831, attempted the same work at the Salpetrière, and in 1833, Dr. Voisin opened a private school for idiots in Paris, but not one of these attempts was successful enough to insure its continuance.

Before this time some work along these lines had been done in America at the American Asylum for the Deaf and Dumb at Hartford, where several idiotic children had been given instruction and had shown a fair degree of improvement in their physical condition, habits and speech.

But it was in 1837 that Dr. Seguin, the author of the "Treatise on Idiocy", a work which up to the present time is the standard text-book for all interested in the education of idiots, began the private instruction of idiots at his own expense. After working several years at the Bicêtre and in the Hospice des Incurables and publishing several pamphlets describing his work, Dr. Seguin had his methods of training and educating idiot children examined thoroughly by a committee from the Academy of Sciences at Paris in 1844. This committee commended his work very highly, declaring that up to the time he had commenced his labours in 1837, idiots could not be educated by any means previously known, but that he had solved the problem.

Dr. Seguin, in 1846, published his book "Treatise on Idiocy", which was crowned by the Academy. His elaborate system of teaching and training idiots consisted in the careful "adaptation of the principles of physiology, through physiological means and instruments, to the development of the dynamic, perceptive, reflective and spontaneous functions of youth". This physiological

education of defective brains, as a result of systematic training of the special senses, the functions and the muscular system, was looked upon as a visionary theory, but it has been verified and confirmed by modern experiments and researches in physiological psychology. Dr. Seguin continued his school in Paris until the Revolution in 1848, and it was visited by scientists and philanthropists from all over the world, with the result that schools were soon established in other countries, based on his methods. After the closing of his school, he came to the United States where he was instrumental in founding schools in various states.

In 1842 Dr. Guggenbuhl had established a school upon the slope of the Abendenburg in Switzerland, where cretins, so many of whom are found in that country, were given a training. At Berlin, in 1842, Dr. Saegert opened a school for the instruction of idiots, and in England, through the publication of the results of the work of Drs. Seguin, Guggenbuhl, and Saegert, a private school was opened at Bath in 1846. This initial attempt to care for the mentally defective in England finally resulted in the splendid institutions at Colchester and Carlswood.

The published description of the methods and results of these European schools attracted much interest and attention in the United States. In 1848, the first State institution for the care and training of the feebleminded was opened in the State of Massachusetts under the direction of Dr. Howe, and the school proved so successful at the end of three years that the legislature doubled the annual appropriation.

In the State of New York, after many attempts, an act was passed in July, 1851, appropriating $6,000 annually, for two years, for the purpose of maintaining an experimental school for idiots. The school was opened in October, 1851, under the supervision of Dr. H. W. Wilbur, who had so successfully organized and conducted for more than three years his private school at Bane, Mass.

The State of Pennsylvania was not long in taking up the work, and in 1852 a private school for idiots was opened in Germantown by Mr. J. B. Richards. This school was incorporated in 1853 as the Pennsylvania Training School for Idiots and Feebleminded Children. The first money received for its support was raised by private subscription and the State contributed an equal sum.

Within twenty-six years after the work for the mentally defective was started in the United States, public or semi-public institutions for their care had been established in seven States. These institutions then had a total of 1,041 pupils under training.

To-day there are eleven States which have separate institutions for the feebleminded and epileptic. Nineteen states have institutions where the feebleminded and epileptic are looked after together.

The foregoing is briefly a history of what has been done for the mentally defective in countries outside of Canada. When we turn to our own country to see what provision has been made for the feebleminded, we are not very enthusiastic. Although very little has been done, we should not be discouraged, because there is an interest shown in an immense problem, which is growing by leaps and bounds. Probably the first organized attempt to tackle and solve the question of what to do with that class of people which was such a burden on the community in Canada, was undertaken by the National Council of Women. They, through the gathering of statistics in other countries and also in a limited way in Canada, mainly through the efforts of Dr. Helen McMurchy of Toronto, have tried to have legislation passed by both federal and provincial governments which would take care of the feebleminded. They were, however, working under the disadvantage of not having enough facts showing the seriousness of the problem in this country to impress our legislators.

In the province of Ontario, valuable work has been accomplished through the efforts of Dr. Helen McMurchy and Dr. C. K. Clarke. Dr. McMurchy, who is Inspector of Auxiliary Classes for the Ontario Government, has, through the collection of valuable statistics and the publication of her annual report, gradually impressed the government and the public in her province with the importance of caring for the feebleminded. Through the psychiatric clinic at the Toronto General Hospital, Dr. Clarke with his assistants, Dr. Hincks and Dr. Withrow, have collected valuable data. Between April 4th, 1914, and September 1st, 1918, 4,347 cases have been examined at this clinic, and of these numbers 50 per cent. were mentally defective, or including the so-called backward, who in nearly all cases were feebleminded, almost 60 per cent., while the insane number more than 14 per cent. The supposedly normal only number five hundred and nine altogether. For fuller statistics on the psychiatric clinic in Toronto, the reader is referred to Dr. Clarke's article in the first issue of the *Canadian Journal of Mental Hygiene.*

The province of Manitoba has probably taken the most forward step of any of the provinces in Canada. In 1918 the government of Manitoba, through the Public Welfare Commission, requested the Canadian National Committee for Mental Hygiene to

make a thorough survey of conditions in Manitoba, particularly in reference to hospitals for the insane and other institutions where mental defectives were housed. This survey was also to cover such questions as the examination of child delinquents, juvenile courts, prostitution, etc. The survey was started and completed in the month of October. The report of this study was thorough, every phase of the care of the mentally abnormal was gone into and many of the recommendations were drastic. The government has, however, approved of all of the recommendations with the result that the province of Manitoba will soon have a system of caring for the mentally abnormal second to no other.

The province of British Columbia has now asked the Canadian National Committee for Mental Hygiene to make a survey of their province and the Committee hopes to be able to undertake this work in June.

When we turn to our own province of Quebec, very little evidence of progress in the care of the feebleminded can be recorded. Many attempts have been made to impress upon the government the seriousness of the situation, but so far with very little result. The Local Council of Women in Montreal, under the leadership of Professor Carrie Derick, has been very active in this respect, and they have done a great deal of pioneer work in keeping this vital problem before the eyes of the public. In 1914, the writer examined all the boys at the Shawbridge Boys' Farm. Practically all these boys were sent there by the Juvenile Court for various types of delinquency. Eighty-seven children in all were examined, and the results of the examination were quite in accord with the findings of other investigations. Forty-two out of eighty-seven children, or 48·27 per cent. were mentally defective, twenty were normal, and in three cases the examination was unsatisfactory owing to the nervousness of the child. These results, as have been said, were quite in accord with the results of examinations conducted in Toronto, Chicago, and other cities in the United States. The question of immigration was not studied thoroughly in this survey, but a large proportion of the boys examined were children of immigrants, and if these parents, who are probably mentally defective, had been debarred from entering Canada at their port of entry, we would not now have to deal with their defective and delinquent children.

In the autumn of 1917, Miss Helen R. Y. Reid, of the Canadian Patriotic Fund, Montreal, asked the writer if he could manage to examine any soldier's wife sent to him by the Fund. She said that

her workers were becoming discouraged by the results obtained by them in working among these women, but she felt that if the workers knew they were dealing with persons who were not normal mentally, that they would tackle the problem from a different angle and not become so discouraged. It was arranged that these women would be examined mentally and if possible have a Wassermann test done on their blood. Up to date, one hundred and thirteen cases have been examined and the results have been startling. Thirty women, out of the one hundred and thirteen, or 26·56 per cent., were mentally defective, seventeen, or 15·04 per cent., gave a positive Wassermann test on their blood, one was mentally normal but a moral degenerate, three were chronic alcoholics, one was insane, and three were epileptics.

Doctor W. D. Tait, of McGill University, examined, in 1914, all the girls at the Girls' Cottage and Industrial School, St. Lambert, and found the whole eleven girls feebleminded. These were all delinquents, and had been sent to St. Lambert by the Juvenile Court or other agencies.

Last year a committee on the feebleminded, of which Professor C. Derick, of McGill University, was chairman, engaged Miss Cole, social worker, to make a survey of the children in several institutions in Montreal. Owing to lack of funds, this survey was not as thorough as it might have been, but the results showed that a large proportion of the children in these institutions were feebleminded.

The actual work done in collecting statistics of the number of feebleminded in the province of Quebec has been small, but with the statistics from other provinces and countries, there should be enough evidence to convince our legislature that some provision should be made for the care of them. However, the government does not seem to be impressed with figures from other countries. They hide behind the statement that the province of Quebec cannot have so many defectives as shown by such figures.

What, therefore, must be done to prove to the government that there are thousands of feebleminded in Quebec, and what is the best way to gather statistics? Legislatures and committees are moved to action by facts, not generalities and guesses.

Provincial control of the feebleminded involves the progressive steps of identification, registration, instruction, supervision and segregation.

Identification or diagnosis should be based on a well-considered and established normality. It is better to register only a few feebleminded than to register many who are not feebleminded.

Our standards and methods of deciding about mental defectives should be in accord with the best thought and scientific knowledge of the time, but the details and the terminology of the process should not be described to the general public in such ultra-scientific and high-sounding terms that the public will be rendered unsympathetic, if not skeptical. Dr. C. K. Clarke, of Toronto, uses a study of family history, economic efficiency, and moral reactions, along with the German revision of the Binet-Simon tests.

The identification of the feebleminded can best be done through the establishment of psychiatric or psychopathic clinics attached to the various general hospitals in the province and the making of surveys in the schools and different institutions.

The public school should really be the clearing house for mental defectives, but to make it absolutely satisfactory, compulsory education is necessary. Unfortunately the province of Quebec still clings to mediæval ideas on education, and while this idea lasts, there will be thousands of illiterates and feebleminded roaming our streets. Provided there was a compulsory education law which compelled every child to go to school up to the age of fourteen, there should be an efficient medical examination of every child. This examination would include not only a physical but a mental one as well.

Every juvenile court should have attached to it a thoroughly trained physician, who could put every delinquent child through a mental test. In the efficiently run juvenile court to-day, the presiding judge finds that the aid of a well trained physician is of invaluable help to him in knowing how to dispose of the boys and girls brought before him.

Every Recorder's court should have attached to it a physician trained in mental work. If every prostitute in the city of Montreal could be examined mentally, the cause of her being in such a trade would soon be discovered.

The problem in our province is large, but the people are slowly beginning to realize the menace of having so many mentally defective persons roaming about the country and what a cost they are to the government. We need a complete survey of the province, and then adequate provision made for the care and segregation of the feebleminded and mentally abnormal or insane.

Editorial

THE PUBLIC AND MALIGNANT DISEASE

THE number of deaths that occur each year from malignant disease is appalling. There are reasons for thinking cancer is increasing. Without debating that point, one can say that it occurs with alarming frequency. Only too often do people suffering from malignant disease apply for relief, for the first time, after the growth has made considerable progress and become diffused, more or less through the blood and lymph channels.

There are several reasons why this is so. It may develop in some organ or tissue that is deep seated and therefore without the field of observation. It often is of insidious growth, and for a time may give rise neither to pain nor disturbance of function. In other cases the host has a dread of cancer and fails to consult a doctor about a visible and palpable lump for fear that he or she will be told that it is cancer.

It is of course of prime importance that all forms of malignant disease be recognized early, and the public should be urged to consult their physician promptly regarding the character of any nodule or suspicious ulcer or growth. An effort is being made in the United States to educate the public on these subjects. An "American Society for the Control of Cancer" was formed with this object in view. They appeal through popular journals, including the *Ladies' Home Journal*, Women's Clubs, etc.

The idea took shape, if we are not mistaken, at a breakfast table, in Denver, several years ago during the meeting of the American Surgical Association in that city.

The Women's Clubs represent in themselves a great

potential force for promoting the health education of women, particularly in connection with the diseases of adult life. One eighth of all the deaths of women above the age of forty are due to cancer. This is because of the unfortunate susceptibility of the female organs to the disease. The early stages of this malady are more capable of successful treatment than the later. Hence the importance of early recognition.

Men also should be educated to apply early for advice regarding suspicious abnormal states of the mouth and the tongue, of deranged stomach and bowel or of rectal trouble. The aim and object of the American Society for the "Control of Cancer" is commendable. Until we know more of the conditions favouring the growth of cancer and of its treatment, our hope lies in avoiding and relieving irritation, and in early diagnosis and treatment. An appreciation of the situation by the public is a help, and every means should be taken to encourage early consultation in obscure and persistent growths especially in those over forty years of age.

THE MEDICAL AND ALLIED PROFESSIONS AS A STATE SERVICE

IN the November issue of the *Public Health Journal* there is an article by Professor Fraser Harris of Dalhousie University on the medical and allied professions becoming a state service. Such a notion is not new; but the address before us, originally read at the annual meeting of the Association of Medical Officers of Health of Nova Scotia, July 1st, 1919, is a serious attempt to prove that the practitioners of medicine and its allied activities should become servants of the state in a public department similar in status and practice to the civil service. As Professor Fraser Harris points out, preventive medicine is already a state department, so that it is not anything so very extreme to suggest that curative medicine, the other half, should also be made the concern of the state seeing that the public health is conserved by the activi-

ties of both these aspects of the healing art. The author pictures a time when all medical instruction will be given by state aided universities and when on graduating, each student would automatically enter the state medical service (S.M.S.) and choose whether he would serve the state in the practice of medicine, or of surgery, or of obstetrics, or as a pathologist or bacteriologist or hygienist or some other "specialist" or expert. All these alike serve the public which is "the state", and it is contended that all medical men should give up the wearisome, unorganized competition of private practice and become the valued (and pensioned) officers of the noblest state service that can be conceived of. The Indian Medical Service might serve as the general model to be followed.

Some place at last would be found for the "researcher" in the medical and allied services. At present this man, who does not care for "practice" and has an aptitude for research, finds himself unable to support himself unless he accepts a teaching post which may demand too much of his time and may be very poorly paid. The researcher would be an officer of the State Medical Service no less than the surgeon or obstetrician.

The benefits to the public, especially to the poorer sections of it, are obvious and numerous. Anyone, no matter who or where, could summon to his aid the highest skill available; and all methods of treatment and of scientific diagnosis would be as easily obtainable. Of course the public would have to be taxed for all these benefits. All such details as scale of pay, pensions, duties, administrative districts, etc., are gone into fully in the article which must be consulted on those points. The benefits to medical men themselves are not less distinct than those to the public. Each medical man, as an officer in the State Medical Service, would have a competence from the very first hour of his being "qualified", while those in the higher ranks of the service should make large incomes.

Professor Harris examines certain criticisms and objections to the establishment of a State Medical Service, the most serious of which would seem to be abolishing the right of the individual to the free choice of his, or much more probably *her* medical man. This difficulty is more apparent than real and is no insurmountable obstacle. A far greater danger is the possibility of political influence in the appointments. In this connection Professor Harris says:—"The service would be administered not by figure-heads but by medical men and experts themselves. The appointees would receive their commissions not by favour, caprice, or nepotism, but by merit brought out at examination." This true Socialism, the professor suggests, might be called co-operationism seeing that the term Socialism is liable to be misunderstood. In the minds of many it means the philistinism of the red tie, whereas the State Medical Service must be the most honourable, although it may be the youngest of any of the public services; unless this is admitted and recognized it will not succeed. The present may not be just the right time to create the State Medical Service, but with the Public Health department already created, there occurs no valid reason why the scheme advocated in this interesting address should not be attempted in the near future.

THE VALUE OF PSYCHOPATHIC HOSPITALS

IT has been stated that the two departments of medical science which received the greatest impetus and stimulation during and as a result of the Great War were orthopædic surgery and neuro-psychiatry.

Canada, for many years, has been confronted with the problem of what to do with the criminal, the juvenile delinquent, the prostitute and the moral degenerate. To-day it is becoming generally recognized that mental factors play a great part in this problem and that human behaviour can be

neither successfully studied nor effectively directed without taking into account the facts of mental life.

Since April, 1918, when the Canadian National Committee for Mental Hygiene was organized, many facts in connection with these problems have been discovered. A survey of the province of Manitoba showed that the care and treatment of the mentally abnormal and mentally defective were very mediæval. The asylums were mere custodial institutions where the treatment was practically nil. There was no attempt at classification of patients, no laboratories were provided to aid in scientific diagnosis and every institution was greatly understaffed. The mentally defective were herded together with practically no attempt to improve their condition or to make them happy. It was shown that a large proportion of the criminals, juvenile delinquents, prostitutes and unmarried mothers were mentally defective. The recommendations for improving these conditions were drastic, but the government realized the situation, and to-day, Manitoba is in the process of having the most up-to-date system on this continent for caring for their insane and mentally defective. A psychopathic department in connection with the Winnipeg General Hospital has been established under the directorship of a thoroughly trained physician and now no case of mental abnormality can be admitted to or discharged from any institution without first being observed in the psychopathic hospital.

The province of British Columbia has also been investigated by the same committee and here practically the same conditions were found as in Manitoba. Its government, however, has also realized the position and plans are being made for up-to-date institutions to care for all individuals suffering from any mental abnormality or deficiency.

In the province of Ontario the mental hygiene movement has also made a great advance although perhaps not in such a spectacular manner as in the western provinces. A reception hospital is being built in the city of Toronto for the

admission of all patients suspected of suffering from any mental abnormality or deficiency. A report by the Hon. Justice Hodgins, chairman of the commission to report on the care and control of the mentally defective, is very conclusive. Mr. Hodgins in part says:—"That if the cardinal fact could be assimilated, that the elimination of the mentally defective from the school and from the street, and from the agencies engaged in reforming character, would render the efforts of teachers and social workers comparatively easy, and empty the jails of over half their inmates, and that if it were generally realized that these unfortunates can, if taken in time, be made comparatively happy and useful, there would be little time lost in bringing about the desired result. A survey of the jails, reformatories and other institutions is urgently needed in order to relieve them of all mentally defective. Feebleminded females of child-bearing age, and feebleminded delinquents who are "repeaters" or show marked criminal instincts should be detained indefinitely." A survey of the public schools in Toronto and Guelph shows that there are a large number of mental defectives who are not only not able to advance themselves, but are retarding the normal children.

In the province of Quebec, progress is being made along the lines of improved mental hygiene. It is well known that the asylums in this province are largely custodial institutions privately owned. While this is the case we cannot hope for the proper care and treatment of the mentally insane. Every institution is under-staffed, the physicians are poorly paid, there is not a sufficient number of attendants or nurses and laboratories are non-existent.

Practically no attempt has been made in the province of Quebec to care for the feebleminded or the epileptic. What is needed is a state institution on the colony plan, with one department for the feebleminded and one for the epileptic. As soon as possible also the present institutions for the care of the insane should be taken over by the government as has been done in all the other provinces of Canada.

The provinces of Nova Scotia, New Brunswick, and Prince Edward Island are very much behind the times in caring for their mental patients. However, New Brunswick has asked for a survey to be made by the National Committee for Mental Hygiene and it is hoped that when this is completed, the province will assume the proper care of the mentally abnormal. Nova Scotia also has shown a desire to grapple with this problem and find some solution for it.

What we need in Canada is an up-to-date psychopathic hospital in every large city. Such a hospital, where possible, should be an entirely separate institution and not attached to a general hospital but in many cases this may not be practicable on account of the difficulty of obtaining a sufficient number of nurses and attendants. The duty of this hospital would be to diagnose every case of mental abnormality and to decide on treatment. Many patients who become insane and have to be sent to the provincial asylums and there become chronic cases, could be cured in a psychopathic hospital and returned to private life. One has only to inspect the hospital at Cobourg for military insane patients and observe their results to be convinced that many cases of insanity are curable. At this hospital, 58 per cent. of the inmates have been returned to their homes where they are able to live their ordinary life.

New Facts, New Suggestions

METABOLISM AND THE SALICYLATES

In a recent paper, Hanzlik and Wetzel (*Journal Pharmacology and Exp. Therapeutics*, Sept., 1919), call attention to the result of their investigations into the fate of salicylates in the body. It has been known that a large amount of the salicyl radical was excreted by the kidney virtually unchanged. According to the recent researches of Hanzlik about 20 per cent. of this radical administered to normal human beings is destroyed in the organism since the loss cannot be accounted for in sweat fæces or by retention in the tissues. This destruction may go on in excised organs and even in tissue pulp. Even weak solutions of sodium salicylate gradually deteriorate unless they are protected from microbiotic forms by means of efficient antiseptics; both yeasts and fungi can destroy the drug. The destruction of the drug in the system appears therefore to be dependent upon metabolic activity, and will be increased under all conditions in which metabolism itself is augmented. Hanzlik and Wetzel note increased loss of salicylates administered in fever, and especially in acute rheumatism and in tuberculosis. They also noted that drug habitués addicted to the use of alcohol and morphine were found to secrete much less salicyluric acid than normal persons, a fact which they attribute to an increased power in such persons of an increased destruction of drugs.

The importance of these researches lies in their application to therapeutics. In febrile conditions the action of a drug is dependent upon the amount circulating in the blood. Small doses producing a low concentration in the blood not only are rendered still smaller by rapid elimination but also by destruction of the drug; to secure prompt therapeutic effects large doses frequently repeated are required. Toxic symptoms, however, are to be avoided.

A NEW ANTISEPTIC

An interesting paper appears in a recent number of the *Journal of the American Medical Association* on the results of research

work carried on in the James Buchanan Brady Urological Institute connected with the Johns Hopkins Hospital, in an endeavour to obtain a really effective antiseptic for local use in the genito-urinary tract. Impressed with the antiseptic possibilities of the flavine group of dyes, the writers attempted to obtain some combination of a penetrating dye with other antiseptic drugs which would be comparatively non-toxic and non-irritating, but which should possess a penetrating germicidal power. Their aim was to discover some synthetic combination which would possess the following properties: (1) Ready penetration of the tissues in which the infection exists; (2) Lack of irritating properties on the tissues; (3) High germicidal activity; (4) Ready solubility in water with stability of the solution even in urinary fluids; (5) A low toxicity to the human organism. Clinical experience showed that the basic dyes such as fuchsin, brilliant green, crystal violet, and in some cases the flavines, are too irritating to the mucosa. The acid dyes appeared to be less irritating. The former are salts of weak bases, and their solution has an acid reaction, while the acid dyes are employed as sodium salts, and solutions of them have a neutral or slightly alkaline reaction. Mercury was chosen as the active germicidal principle to be substituted in the dye molecule. The organic preparations of mercury exhibited lower toxicity than did the inorganic salts. It was hoped to find some organic combination in which the advantage of non-irritability, low toxicity and high penetrating power more than offset a somewhat decreased germicidal power as compared with its inorganic salt. After prolonged experimentation, a substance was obtained by substituting one atom of mercury in the molecule of dibromfluorescin to which the name of mercuro chrome-220 has been applied. It is a red powder, insoluble in water but readily soluble in sodium hydroxide solution forming a liquid of a deep red cherry colour, showing fluorescence on dilution. This solution is stable, and is not affected by moderate heat or exposure to the air. Strongly acid urine gives a slight precipitate of the free dye, but if the acidity is low, no precipitation occurs. There is entire freedom from precipitation when a one per cent. solution of the drug is mixed with an equal volume of a medium rich in protein, such as hydrocele fluid. While 10 m.g. per kilogram given to dogs produced an albuminuria without casts, no evidence of kidney damage was found at necropsy. It is inferred, therefore, that the small amount of the drug which may be absorbed from its local use will do no harm. Solutions of the drug in strength from 0·1 to 5 per cent. have been used in

the human genito-urinary tract as a local antiseptic producing no sign of irritation. In the urethra a 5 per cent. solution caused only temporary burning. In cases of acute urethritis, a 1 per cent. solution injected four times a day and retained five minutes at each injection produced only temporary smarting. The solution has been used without giving rise to irritation in a number of bladder infections accompanied by small amounts of residual urine. The outstanding fact observed on comparing its action with other germicidal drugs is the rapidity of its action in fairly high dilution. In one minite in a dilution of 1 in 1000, it kills bacillus coli and staphylococcus aureus, a result obtained with no other available antiseptic. Dr. Hugh Young and Dr. Edwin White of the Johns Hopkins Hospital consider that they have in this new synthetic germicide a drug of demonstrated value which in their hands has speedily cleared up old infections of the bladder and renal pelvis, with a remarkable absence of any local irritation.

THE EFFECT OF DIGITALIS ON THE DIGITALIS HEART

DURING the influenza epidemic of last year, Stuart Hart, in the Presbyterian Hospital, New York (*Am. Jour. Med. Sciences*, November, 1919), made a careful study of the condition of the heart in those attacked by the disease, and of the manner in which the action of the heart was affected by digitalis in those who developed broncho-pneumonia. In summing up the results of his investigations, he states that: Individuals with chronic valvular disease withstood the toxæmia of the pneumonia of this epidemic very badly. Individuals with normal hearts who developed pneumonia did not, as a rule, die from cardiac failure, and the post mortems offered no proof that these hearts were essentially damaged. Patients suffering from broncho-pneumonia who received full doses of digitalis, and in whom the effect of the drug was carefully checked by electrocardiographic studies, showed no change whatever in their pulse or blood pressure, when compared with others similarly suffering but not receiving the drug. The only exceptions were in cases of auricular fibrillation, in which slowing of the pulse rate was observed. In a few instances symptoms of actual auriculo-ventricular block developed under treatment even in apparently normal hearts. Hart therefore advises that unless the need is very urgent, it is wiser to give digitalis in moderate amounts and to approach complete digitalization gradually, rather than by the use of the enormous initial doses that have been advised by some clinicians.

RECENT RESEARCHES ON THE MUSCULATURE OF THE STOMACH

Experiments of Alvarez, instructor in research medicine, University of California, direct attention to the more rapid rate of contraction and the shorter latent period in the gastric musculature in the cardia than in that of the pyloric portion. Alvarez considers that there is evidence for the view that the rythmicity of the primitive gastro-intestinal tube was graded downwards from pharynx to anus much as the rhythmicity of the primitive heart tube is graded from the venous to the aortic end. Specialization in function has been accompanied by a specialization in muscle and a loss in rhythmicity. The most rhythmic muscle is to be found along the lesser curvature associated with a small area which may be likened to a pacemaker at the cardia. In experiments the segment from the lesser curvature next to the cardia always showed the greatest tendency to rhythmic contraction, while the amplitude of its waves was smallest; the rate of contraction decreased progressively to the pyloric end; the amplitude of the wave was largest at the antrum. He considered that there was a definite gradient of irritability from cardia to pylorus in the neighbourhood of which the latent period was the longest. The muscle in the *pars pylorica* appears to be quite different from that of the rest of the stomach, and is especially fitted to do the hard work of that organ. The muscle on the lesser curvature near the cardia is very sensitive to trauma and to injurious conditions which seem to have no effect on the muscle from the antrum. There is evidence also which suggests that there is a gradient of metabolism underlying and perhaps giving rise to the gradients of irritability.

TARTRATE OF ANTIMONY IN THE TREATMENT OF BILHARZIA

J. B. Christopherson who first recommended the use of the tartrate of antimony in the treatment of bilharzia disease draws attention (*Brit. Med. Jour.*, October 18, 1919) not only to the susceptibility of the parasite, *Schistosoma hæmatobia* and *Mansoni* to this drug, but also to the permeability of the shell of its ovum. This opens up the possibility of sterilizing the multitude of carriers of the disease who continue to infect the fresh water molluscs through which the disease is propagated. It is hoped

that shortly owing to this discovery means may be taken to rid Egypt and the Sudan and South Africa of an endemic disease of national importance.

MENINGO-ENCEPHALITIS IN MUMPS

MAJOR TASKEN HOWARD of the United States medical service reports (*Am. Jour. Med. Sciences*, November, 1919) three cases of meningo-encephalitis occurring during an epidemic of mumps. The spinal fluids showed an increase of mononuclear cells and a slight globulin reaction. In two cases a gram-positive diplococcus was found. All the cases recovered after lumbar puncture.

Lieutenant Haden in the same epidemic isolated a gram positive diplococcus from the blood, spinal fluid and a lymph gland from five cases of mumps.

MORTALITY OF TUBERCULAR PATIENTS

THE medical research committee has issued a report by Bardswell and Thompson upon the after histories of 1,707 patients discharged from the King Edward VII Sanatorium during seven years.

The mortality was compared with that of the general population by the actuarial method.

Compared with English life table No. 8, it was found that of the incipient cases, the mortality was five to six times the average; of the moderately advanced, fifteen to twenty times, and of the advanced cases nearly forty times greater than the average.

A separate section relating to a comparison between the mortality of those receiving tuberculin and those receiving sanatorium treatment without tuberculin showed no appreciable difference.

SOME EXTRACTS FROM "ANATOMISTS IN SEARCH OF THE SOUL"

IN a very interesting essay which appears in *The Annals of Medical History*, vol. ii, No. 1, Dr. George W. Corner gives us a very humorous account of the search of old anatomists for the true seat of the soul.

For two thousand years the pious hands of anatomists sought the springs of life in the tissues of animals, and even attempted to find in the bodies of the dead the organic seat of man's immortality.

The first civilized dissectors were those Sumerian priests and haruspices who drew auguries from the viscera of sacrificial animals and the first organ which was thought to be the temple of the soul was the liver. The Psalmist literally said, "The liver of the righteous man shall be made fat." "My liver shall sing praise to thee and not be silent."

Primitive man, opening the abdomen of a beast saw much that explained itself. The stomach, the intestines, the kidneys, bespoke their own functions by their very contents or their connections, and being understood, were no cause for wonder. But the liver, largest and heaviest mass of all, blood hued and as it seemed the source of all the veins, with spreading lobes and the strangely coloured vessel of gall, offered an inviting mystery, and could not fail to be the seat of faculties less ignobly comprehensible than were those of emunction or digestion. Was it not then the source of all the blood, of bodily warmth, of life itself?

Centuries later, with the practice of dissection, other organs were exposed and the seeker after the "soul" was forced to gaze upon each newly uncovered, and therefore misunderstood organ as the temporal dwelling place of the soul. And even more, each anatomist of any reputation seems to have been expected to declare where, in his opinion, the "soul" reposed. Many men became students of anatomy for the expressed purpose of discovering the hiding place of the "soul". In the Hippocratic writing "De Corde", the left ventricle (found empty after death) contains the vital principle or pneuma which is to be sent throughout the body by the arteries.

As time went on and knowledge increased, the higher functions

became established in the brain, and then the search became narrowed. The meninges, cerebellum, ventricles, all for a time were believed to be the resting place of the much sought after "soul".

Galen believed that the soul or "animal spirit" was contained in the ventricles and that here it underwent a process of purification; the purified products were supposed to pass into the pores of the brain and the waste products found their way through the pituitary body and were discharged into the nose as "pituita". Galen considered hydrocephalus due to some defect in this process of elaboration of the "soul".

Most striking guess of all was that of Strato, of Lampascus, who found the *pars princeps animæ* in the middle of the forehead between the eyebrows—in the very substance of the skull, between brain and eyes, where thought and vision meet.

But the inner self of these Greeks was in general no more than what we vaguely mean by the word "life".

With the acceptance of Christianity and the conception of the soul as an immortal entity, the soul became freed from the trammels of the body for Eternity, yet it bound the spirit subject to the flesh during the span of earthly existence, and herein it raised a strange new problem for the anatomists of the soul. And so the Latin Fathers turned to Embryology, for they were greatly troubled to know in what manner the soul comes at first to join the body.

There is a quaint account of the formation of the embryo which appears in a long series of books, lay and ecclesiastical. *Aquinas took it from Augustine, who knew it perhaps from some forgotten physician of the third century; Dante from Aquinas, and versified it in his Purgatory. Henri de Mondeville put it in a book of surgery, and from him Thomas Vicary gave it in English words:* "Thus is the child bred forth in four degrees . . . the thirde degree is, when the principals be shapen, as the Hart, lyver, and Brayne; the fourth and laste, as when all the other members be perfectly shapen, then it receyveth the soule wyth life and breath; and then it beginneth to move itselfe alone; so is ther XLVI dayes from the dayes of conception unto the daye of ful perfection and receyvine of the soule, as God best knoweth."

We have had more than a hint that in all times past the search for the soul has followed the same path; every new seeker passing over the familiar ground traversed by his predecessors, thinking the object of his hope lay in some place beyond, still mysterious and unexplored.

By the middle of the 17th century anatomists had familiarized

themselves with the abdomen, and thorax and it was in the minds of many that the starting point must be somewhere in the brain. René Descartes was moving in this well trodden path when he made his famous assumption that the pineal gland was the seat of the soul. That Descartes' emphasis upon the middle of the head was in accord with the notions of the times we might bring many things to show.

Bartholin and Wharton offered prompt objection to the pineal gland theory. First, they urged, this little body is too small to contain all the images of the soul. Secondly, that the external nerves do not arise from the glandula pinealis.

The third objection is based on the entirely untrue, but more striking notion that the cerebrospinal fluid of the third ventricle is refuse matter from the process of refinement of animal spirits, and hence Descartes was locating the soul in a place of excrements. And so the soul was chased from place to place by earnest investigators. Sir Kenelm Digby decided on the septum pellucidum and gives as his sixth reason for the view: "It is seated in the very hollow of the brain; which of necessity must be the place and receptacle where the species and similitudes of things reside; and where they are moved and tumbled up and down, when we think of many things. And lastly, the situation we put our head in, when we think earnestly of anything, favours this opinion; for then we have our head forwards, as if we were forcing the specieses to settle towards our forehead; that from thence they may rebound, and work upon this diaphonous substance."

Between 1675 and 1700 the soul disappeared from the scope of anatomy as heaven had vanished from the maps of terrestrial geographers. Acuter insight began to distinguish the studies of the mind's activities from pursuit of the soul, keener eyes began to trace the intricacies of the nervous system, and scholars came at last to share the opinion of Sir Thomas Browne. "In the brain, which we term the seat of reason, there is not anything of moment more than I can discover in the crany of a beast; and this is no inconsiderable argument of the inorganity of the soul, at least in that sense we generally so receive it. Thus we are men, and we know not how."

H. P. WRIGHT

Retrospect

DISEASES OF THE GASTRO-INTESTINAL TRACT

By R. H. M. Hardisty

McClure, C. W.: "Certain Diagnostic Aspects of Medico-Surgical Diseases of the Gastro-Intestinal Tract." *Boston Medical and Surgical Journal*, September 25th, 1919.

White, Franklin Warren: "Treatment of Chronic Ulcer of Stomach and Duodenum," *Medical Clinics of North America*, March, 1919.

Dowd, C. N.: "Indications for Operation in Gastric and Duodenal Ulcer." *New York State Journal of Medicine*, September, 1919.

Moynihan, Sir Berkley: "Disappointments after Gastro-Enterostomy." *British Medical Journal*, July 12th, 1919.

Gaither, E. H.: "Role of Diet in the Treatment of Digestive Diseases." *Medical Clinics of North America*, May, 1919.

Brown, Thomas R.: "Late Results of Supposedly Successful Abdominal Operations on the Digestive Tract." *Jour. American Medical Association*, November 15th, 1919.

THE treatment of gastric and duodenal ulcer has been a subject of much discussion in the medical press during the past few years, but it cannot yet be said that either physicians or surgeons have arrived at any unanimity in their conclusions as to the best method of treatment.

McClure, of the Peter Bent Brigham Hospital in Boston, lays stress on the value of fluoroscopic examination in the diagnosis of disease of the gastro-intestinal tract. By this means prompt information is obtained on any abnormal peristalsis or interference with the onward passage of the food. The points to be noted are the following:

1. The amount of the residue in the stomach of a meal taken six hours previously.

2. The character of the peristalsis, and especially the presence of hyperperistalsis.

3. The presence of focal areas of abnormal muscular contraction.

4. The presence of spasms, deformities, or abnormalities in size, shape or position.

5. Any alteration or obliteration of the duodenal cap.

The more important abnormalities met with are increased or lessened muscular activity, and changes in structure producing deformity. By repeated fluoroscopic examination, overgrowth and spasm may be differentiated. Hyperperistalsis, any residue present six hours after a meal, and any deformity in the stomach walls are significant of ulcer. Spasm may be due to intrinsic (ulcer) or extrinsic (disease elsewhere) causes. If due to the latter, it generally disappears after the administration of atropine. Reverse peristalsis always indicates an organic lesion. McClure emphasizes the desirability of having radiographic records taken at intervals for several months after operation.

Gaither, of Johns Hopkins Hospital, writes that with careful use of all recognized methods of examination it is now possible to make a diagnosis of gastric or duodenal ulcer. When a diagnosis has been made, medical treatment with only a few exceptions should first be employed, and in a large percentage of cases a cure may be expected. If, however, medical treatment carried out faithfully and intelligently fails to cure, recourse must be had to surgery. The results of operative measures, when skilfully performed, he regards as excellent.

White details the treatment of chronic ulcer as employed by him in the Boston City Hospital. Accepting Rosenow's theory of a possible infectious origin in many instances, he insists on a careful examination of all sources of infection in teeth, tonsils, appendix, etc. He then places the patient at rest in bed and endeavours to lessen peristalsis and secretion by means of bland food, alkalies, sedative drugs, atropine and lavage. His aim is to individualize the treatment, according to the size and position of the ulcer, and the symptoms produced. Cases in which retention exists, or in which a large ulcer is present, require as a rule surgical treatment. In all other cases medical treatment should be given a fair trial. Dr. White employs a modified Lenhartz diet, keeps severe cases in bed for four weeks or more and strongly recommends that the mild cases be kept in bed for at least one week. He uses gastric lavage by means of stomach tube in cases with spasm, but does not use the duodenal tube. In cases with hæmorrhage, he administers morphine and strychnine hypodermically, and gives adrenalin by the mouth for its local action. Transfusion he con-

siders of service for the resulting anæmia, but of little value in checking acute bleeding.

A frequent error in medical treatment after relief from the symptoms is obtained, is neglecting to keep the patient under regular inspection. The patient should report every three or four weeks for careful examination as to general condition and freedom of stools from occult blood, and for skiagraphic examination of the stomach.

Freedom from symptoms for six months, with no occult blood in the stools and the *x*-ray showing a filling up ulcer may be regarded as a cure .

Einhorn lays stress on the importance of his string test, and many men vouch for its usefulness. He gives his technique in detail. The duodenal bucket is attached to a white silk thread, No. 5 English Braid, 75-85 c.m. in length and is swallowed in the evening with a glass of water. It is allowed to pass along the digestive tract while the patient sleeps. It is withdrawn in the morning. Blood stains appearing repeatedly in the silk thread at the same distance from the teeth point to ulcer, its exact position can be determined by measuring the thread. The cardia is taken as 40 c.m. and the pylorus as 55-56 c.m. from the teeth. The permeability of the pylorus may also be determined by noting the presence of bile stains on the string and measuring. If the string shows no bile stains and more than 56 c.m. have been swallowed, impermeability of the pylorus is inferred.

Dowd reports one hundred cases of gastric and duodenal ulcer seen by him at the Roosevelt Hospital and in private practice. The histories of these cases with the results of their careful physical examinations, test meals and repeated skiagraphs, when summarized gave clear indications for treatment in 88 cases. In cases in which the diagnosis was made of perforated ulcer, of ulcer with stenosis, of ulcer resisting treatment and of hour glass stomach operation was regarded as necessary.

Cases of ulcer without stenosis require careful investigation, and errors may be made. Cases in which gallstones or appendicitis simulate gastric or duodenal ulcer may require operation before a diagnosis can be made.

Operation on a bleeding ulcer is not as a rule advisable. Immediate operation in these cases gives a mortality of from 36 per cent. to 62 per cent. Transfusion should be employed and operation posponed till a later date.

Moynihan, in his paper on "Disappointments after Gastro-

Enterostomy" attributes some of them to a faulty diagnosis, and states that he has known this operation to have been performed for the relief of functional disorders, and for disease in other organs such as appendicitis, cholecystitis, etc., simulating organic disease in the stomach.

In other cases he attributes failure to an incomplete operation and instances the case of ulcer of the lesser curvature or body of the stomach, which will not heal if only a gastro-enterostomy is done. The technique of the operation may also have been faulty, and the size and position of the opening may not have been suitable. In some cases a jejunal ulcer may develop where the apposition of the edges of the opening has been poor, or where the edges have been injured by clamps. He concludes his paper, however, with the statement that, if the operation is performed in a skilled manner, and in appropriate conditions, there are very few disappointments.

While emphasizing the great value to the physician of the researches of physiologists in this field, Brown considers that it is to surgery with its ability to explore the abdominal cavity and its various diseased conditions with safety, that we owe in great measure our recent advances in gastro-enterology; any attempt to evolve a gastro-intestinal pathology on the basis of secretory variations, he regards as a frail reed. The early reports of the results of surgical treatment, however, were so brilliant, that there arose in the minds of most patients, many clinicians, and more than a few surgeons the idea that the knife was the sole therapeutic agent of value in this field; but, within the past few years a feeling is growing that, although a condition may be fundamentally surgical, the limitations of surgical methods may be such that sequelæ develop which may nullify the good effects of the primary operation. Late results have often been far from ideal, and the second state of the patient has been no better and even worse than the first, owing to post-operative adhesions or partial obstructions. For these reasons medical treatment should always be given a fair and honest trial. In chronic cases, such as chronic appendicitis, and the various forms of abdominal adhesions associated with chronic appendicitis, or with former attacks of gastric or duodenal ulcer or pericholecystitis, many therapeutic means should first be tried. The more important of these are rest with a subsequent appropriate dietary; also local heat and cold, support, posturing and exercises. The elimination of all foci of infection should be carefully considered. Time is most essential, and the patient, while encouraged, should be made to realize that improvement must be slow, and that his

hearty co-operation is necessary to obtain a good result. As improvement sets in, the physician may realize that after all the organic lesion which was fundamentally surgical played but a minor rôle or possibly no part at all in the causation of the symptoms, and that by correcting the functional disturbances associated with it, the patient became so nearly well that he was almost unconscious that any organic lesion was present.

In cases in which a surgical operation is obviously necessary it is extremely important that the proper operation be chosen. Brown regards a gastro-enterostomy, whether with or without a pyloric resection, as essentially unphysiological in that an acid unchymified mass is projected without the benefit of true sphincteric control into a portion of the intestine designed only to receive an alkaline semiliquid chyme. A pyloroplasty or a Polya operation far more closely approaches the normal conditions.

In cases of gastric carcinoma he considers that too many patients are operated upon, merely to confirm an obvious diagnosis, and when opened two few surgeons are willing to make extensive resections in the one hope of producing radical improvement. As for resection of the bowel, Brown considers that in the majority of cases absolute failure is the result.

In order to obtain the best results from surgical measures, Brown thinks a far closer association between surgeon and clinician essential. The surgeon is not trained in dietetics, and is singularly prone to follow a routine in the post-operative management of his cases. Gastric symptoms such as reflex hyperacidity and pylorospasm are apt to persist long after the inciting cause may be reremoved. Every case of major operation on the stomach should be treated exactly like an acute gastric ulcer. Only by a slowly graded dietetic therapy from a few days of absolute starvation, through many days of non-irritating liquid diet, to many weeks of bland, soft diet, can a great many, if not all, of the discouraging sequelæ of these operations be avoided.

Obituary

Dr. A. J. Macaulay died on October 27th, aged fifty-five years. He graduated from Trinity University, Toronto, practised in Brockville for twenty-four years and was the medical health officer of that city. He was a past president of the M. H. O. Ontario Association.

Captain Egbert Gardiner, M.D., C.A.M.C., died suddenly in Cleveland on October 28th, aged thirty-two. He graduated in medicine from McGill University, Montreal.

Dr. J. W. McKay died after an operation for appendicitis at Calgary, November 5th. He graduated in medicine from Toronto University in 1907.

Dr. F. Woodhull, of Hartney, Manitoba, died on October 27th, aged fifty-six years. He was a graduate of Trinity Medical School, Toronto.

Dr. Charles E. Treble, died suddenly of heart disease whilst in the performance of his professional duties at Grace Hospital, Toronto. He was a graduate of Trinity University, Toronto, and an M.R.C.S. and L.R.C.P. of London, England.

Dr. Robert Addison Stevenson died at his home in Toronto, on November 12th. He was a son of the late Judge Stevenson, of Haldimand County. He graduated in medicine at McGill University taking, at a later period, a post-graduate course at St. Thomas' Hospital, London, England, and receiving the degree of M.R.C.S. He was for many years chairman of the staff of Grace Hospital, Toronto, and head of its medical service.

Dr. John W. Mackay, formerly of London, Ontario, died on November 5th, following an operation for appendicitis. He graduated in medicine from Toronto University.

DR. CRANDALL LOUGHERY died on October 25th, at the Montreal General Hospital (a member of its medical staff) after a long illness, from pneumonia and complications. He was twenty-eight years of age. He graduated in medicine from McGill University.

ALEXANDER DUFF STEVENS, M.A., M.D., died at the General Hospital, Sweetsburg, on November 22nd.

Miscellany

News

MANITOBA

A NEW psychopathic clinic has been opened in the Winnipeg General Hospital; there are thirty-two wards. The clinic will be under the direct administration of A. T. Mathers, M.D., C.M.

DR. GORDON BELL has issued a notice requesting every doctor in the province to report any cases of lethargic encephalitis, and to communicate immediately any particulars concerning them.

PLANS for overhauling and enlarging the municipal hospital at Fort Rouge, at a cost of approximately $1,000,000 are under way, but the scheme may not be completed till 1921. The plan is to establish a group of structures in an immense park on property already owned by Winnipeg on the banks of the Red river.

The King George Hospital for infectious diseases would be enlarged at an ultimate cost of $500,000. The King Edward Hospital for tuberculous patients would also be enlarged at a cost of about $75,000. The small-pox hospital at Brookside would be abandoned and reconstructed in the park.

AN application has been made under the Municipal Hospital Act, for the creation of seven new hospital districts, in Manitoba—Birtle, Deloraine, Melita, Pipestone, Souris, Ericksdale and Russell. The aggregate cost will be approximately $200,000.

ALBERTA

THE Alberta Hospitals Association was created at the recent provincial hospital convention. An explanation of the work and aims of the new association has been issued in circulars from Edmonton, addressed to all hospital workers by Dr. James C. Fyshe.

SASKATCHEWAN

THE children's pavilion at the Provincial Sanitarium, Fort Qu'Appelle, was officially opened by Premier Martin. The new hospital is a gift of the Provincial Chapter, I.O.D.E., to the Anti-Tuberculosis League of Saskatchewan.

AT the annual meeting of the board of the Anti-Tuberculosis League, an educational campaign was planned as a means of meeting the tuberculosis menace in the province. The board favours the adoption of a general tax (not to exceed one fifth of a mill). Thus no one municipality or individual would be required to contribute unduly, and suspected cases would be diagnosed in time to permit of curative treatment.

THE Nurse Aid movement, lately inaugurated, had in view supplying the small Union Municipal Hospitals with the necessary nursing help. The Saskatchewan branch of the Red Cross Society has agreed to assist in recruiting these pupil nurses and will further endorse the movement by the endowment of prizes. The Bureau of Public Health will issue a certificate to the Nurse Aid who passes a successful examination, and whose hospital work has been satisfactory through the prescribed time—fifteen months.

THE distinction has been conferred upon Dr. George Peterson of being nominated as senatorial representative of Saskatchewan at the recent Clinical Congress of the American College of Surgeons.

BRITISH COLUMBIA

CAPTAIN B. H. OLSON, M.D., C.A.M.C., recently resigned his position as medical superintendent of the Balfour Sanitarium. He is succeeded by Dr. Kenny, Dr. Bice assumes the position of assistant to the superintendent of the sanitarium.

QUALICUM, Shaughnessy, and other military hospitals in District No. 11 are to be closed. Esquimalt is to be made an exception.

QUEBEC

UNDER the direction of the Montreal Health Department, a circular has been issued of sixteen short paragraphs containing precautions to be taken for the prevention of influenza, how the disease is contracted, and what should be done to prevent its spread to others. The intention is to draw the attention of the population to the possible revival of some cases of the disease.

A PRIVATE bill, it is understood, will be introduced at the forthcoming session of the Legislature by Lord Shaughnessy, Honourable C. J. Doherty and Dr. Francis Devlin for the incorporation of a new hospital in or near Montreal under the name of St. Mary's Memorial Hospital.

A GREAT catastrophe befell the medical community of Montreal on November 22nd, when Laval University was practically destroyed by fire.

THREE new medical officers have been appointed by the Administrative Commission to the infantile hygiene division of the Public Health Department—Dr. G. F. Boyard, Dr. Pierre Perrin, Dr. G. H. Parkes.

ONTARIO

THE amalgamation of the Protestant General Hospital, Ottawa, with St. Luke's, is not far distant. Both boards approve the project, and it has been definitely concluded that the needs of the city could not be any longer met under the present system of divided control. The only solution of the difficulty is the establishment of a civic hospital. A bill has been passed by the Ontario legislature authorizing the city to issue debentures to cover the necessary cost and appoint a board of trustees. When the hospital assets are transferred to the Corporation of Ottawa, it is hoped that the city will establish and maintain a 500-bed hospital.

HON. N. W. ROWELL has made an effective reply to the statement issued by the opponents of prohibition in a widely circulated leaflet purporting to show that since Ontario went dry, the use of drugs has increased to an alarming extent. Since the Government passed an Order-in-Council last May, prohibiting the import or export of these drugs except under license from the Department of

Trade and Commerce, Mr. Rowell shows there has been a tremendous decrease in the importation of narcotics. Although the imports into Canada during the last two years has largely increased, Mr. Rowell explained that this was due not to the consumption of them in this country, but because it was an easy matter to smuggle the narcotics across the international boundary into the United States. He had information from the officers of the department that the growth of imports was not due to prohibition laws in Canada.

THE Dominion Council of Health has settled the distribution to each province of the Federal grant for combatting venereal diseases on a basis of population. The various provinces receive the following amounts: Ontario, $57,473; Quebec, $47,386; New Brunswick, $7,517; Nova Scotia, $10,573; Prince Edward Island, $1,915; Manitoba, $12,611; Saskatchewan, $15,361; Alberta, $11,979; British Columbia, $14,626. These amounts totalled approximately $180,000. The remaining $20,000 will be divided between the advisory council and the Department of Health for fighting the disease. The province receiving the Federal grant undertakes to furnish a like amount.

THE late Hiram Robinson bequeathed $100,000 to the city of Ottawa for the new hospital with the stipulation that the grant is to be used within a specified time for the children's ward.

NOVA SCOTIA

PROFESSOR CLARENCE MOORE has resigned the Chair of Biology of Dalhousie University, to become Principal of Pictou Academy, and has been succeeded by Professor Dowell Young, of Cornell University. Professor Young was invited to take charge of Biology until the appointee to the chair, Professor Dawson, was able to assume his duties next session.

THE Massachusetts-Halifax Health Commission has been actively engaged in working out a constructive programme for the expenditure of the funds remaining in the hands of the Massachusetts Halifax Relief Commission, supplemented by the city Relief Commission. An effort is being made to have a health centre, in which the commission hopes to have co-ordination of health education, disease prevention and administrative effort. Should the movement meet with success, a second health centre will be organized in Halifax with a branch centre at Dartmouth.

COPIES of the new amendment to the Nova Scotia Temperance Act relating to the regulations regarding prescriptions for liquor, have been mailed to physicians. Any infringement of the act renders the offender liable to a fine of one hundred dollars for a first offence, and for each subsequent offence, imprisonment for one month.

THE extensive military hospitals on Camp Hill, Halifax, have been closed.

NEW BRUNSWICK

SIXTEEN candidates passed the examinations for the admission of nurses as registered nurses of the Province of New Brunswick. Only those having had three years' training in a hospital are admitted to these examinations.

NINETY-NINE medical school inspectors have been appointed by the local boards of health throughout New Brunswick.

DR. MABEL HANINGTON recently gave a gratifying report of her work as medical inspector of city schools. She has under supervision approximately eight thousand children.

Book Reviews

A TEXT-BOOK OF UROLOGY IN MEN, WOMEN AND CHILDREN, INCLUDING URINARY AND SEXUAL INFECTIONS, URETHROSCOPY AND CYSTOSCOPY. BY VICTOR COX PEDERSEN, A.M., M.D., F.A.C.S., visiting urologist to St. Mark's Hospital. 991 pages, illustrated with 362 engravings of which 152 are original and 13 coloured plates. Lea & Febiger, Philadelphia, New York, 1919.

AN interesting volume which the author states is "planned on a rather uniform discussion of the clinical side of the diseases included, for the benefit of students and general practitioners, who not being widely familiar with the subject will be concerned by a fixed view point".

It is noted, however, that by far the larger part of this volume, 681 pages in all, is devoted to the consideration of diseases of the

urethra, with particular attention to gonococcal infections. The author devotes the remainder of the volume to a very brief presentation of equally important parts of urology. The work therefore appears to be unbalanced, too little attention being devoted to the bladder, prostate, ureter and kidney. It is, however, well illustrated with many clear, useful and original illustrations. The chapters on urethroscopy and cystoscopy and functional capacity of the kidneys are particularly good. The author gives a brief valuable resumé of the rôle of blood chemistry in urology in estimating real efficiency.

The volume is chiefly to be recommended for its treatment of gonocccal infections, in men, women and children.

F. S. PATCH

THE BLIND: THEIR CONDITION AND THE WORK BEING DONE FOR THEM IN THE UNITED STATES. By HARRY BEST, Ph.D. 763 pages. Publishers: The Macmillan Company, New York and Toronto, 1919.

IT is encouraging in these times of unrest and self-seeking to receive this evidence of patient and long continued effort directed toward an altruistic end. Doctor Best's attempt has been to make a thorough and accurate statement of the condition of the blind in the United States; and of the work being done for them there. He has certainly achieved his ideal; and, while it is true the work deals especially with the United States, much of what it contains is of universal interest. The general headings are: General condition of the blind; Blindness and the possibilities of its prevention; Provision for the education of blind children; Intellectual provision for the adult blind; Material provision for the blind; Organizations interested in the blind; Conclusions with respect to the work for the blind. Each of these includes numerous sub-headings, covering every phase of the subject, and numerous statistical tables accompany the text.

The work is of great general interest, and is indispensable to those specially engaged in caring for the blind.

Doctor Best dedicates his volume to "Those bearing the heaviest of human sorrows, but in whose souls there shineth an everlasting light; and to those who labour for them with infinite courage and faithfulness". He certainly must be included among those who form the second class. W. S. M. B.